ELECTRICAL TIMES

THURSDAY
4 DEC. 1952
NINEPENCE

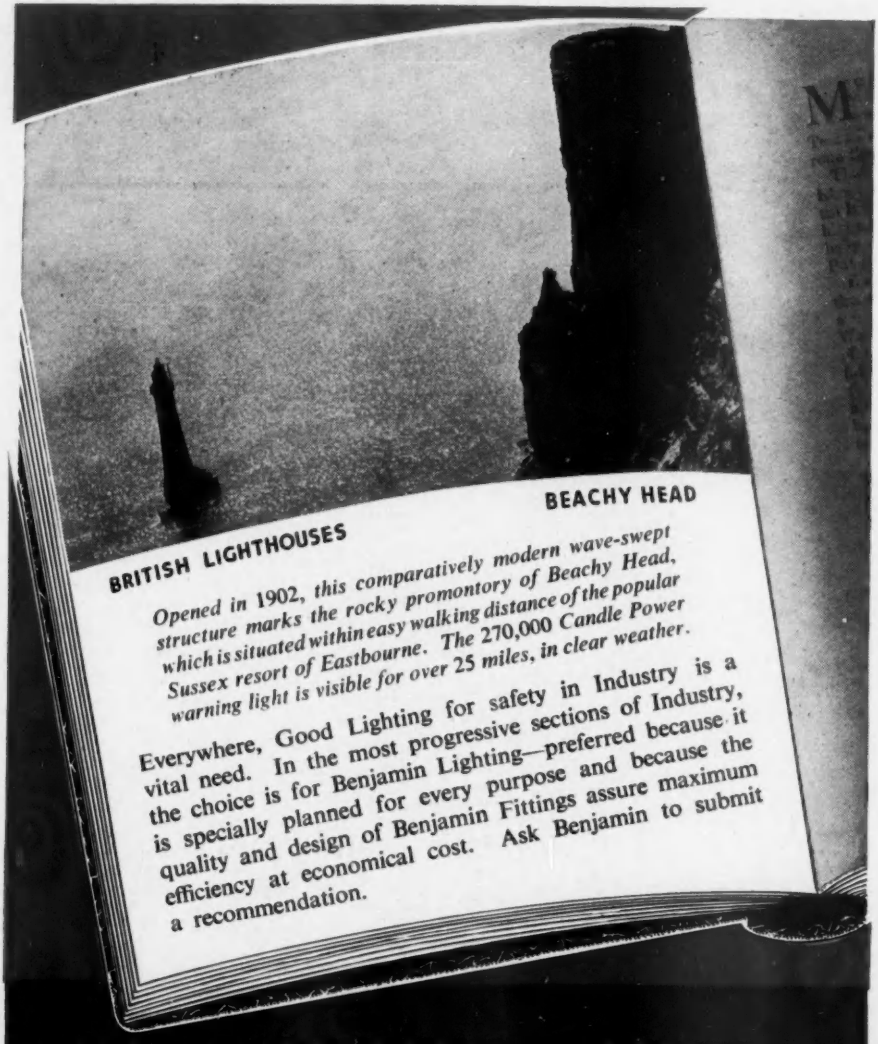
"We had the same sort of trouble at . . . (SSssshhh) until we installed Mazda lamps and lighting equipment"

* * *

When lights are dim, mistakes are rife
It pays to make your lighting stronger
The knowing boffin bets his life
That Mazda lamps stay brighter longer

4408A

THE BRITISH THOMSON-HOUSTON CO. LTD., Crown House, Aldwych, London, W.C.a
(Member of the A.E.I. Group of Companies)


BRITISH LIGHTHOUSES
BEACHY HEAD
Opened in 1902, this comparatively modern wave-swept structure marks the rocky promontory of Beachy Head, which is situated within easy walking distance of the popular Sussex resort of Eastbourne. The 270,000 Candle Power warning light is visible for over 25 miles, in clear weather.
Everywhere, Good Lighting for safety in Industry is a vital need. In the most progressive sections of Industry, the choice is for Benjamin Lighting—preferred because it is specially planned for every purpose and because the quality and design of Benjamin Fittings assure maximum efficiency at economical cost. Ask Benjamin to submit a recommendation.
FOR TRUSTWORTHY LIGHTING—
THE BENJAMIN ELECTRIC LTD
Established 1908
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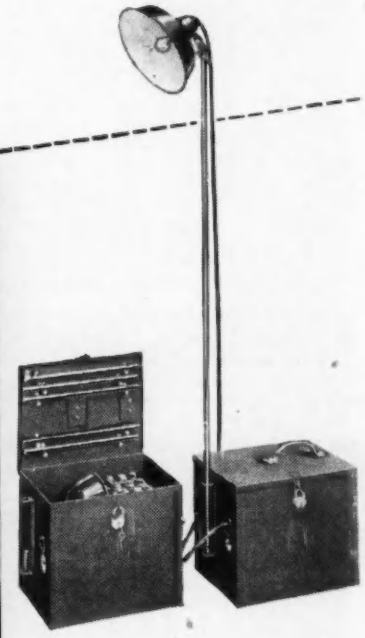
4, BASINGHALL STREET, LEEDS 1. Tel. Leeds 25579
BENJAMIN

In an emergency, turn to NIFE

INSPECTION SET P.6



PORTABLE FLOODLIGHT SET
(TYPE F3M/HR)

Emergencies and breakdowns will crop up from time to time. And when they do, it's good to know you have reliable aids, such as these two Nife lighting sets, always ready to be on the job at a moment's notice. The P.6 INSPECTION SET is a self-contained unit carried on the operator's body. A leather bag is provided for the projector, so that the operator has both hands free when the unit is not actually in use. The P.6 has been found particularly useful for inspecting overhead transmission lines. The F3M/HR PORTABLE FLOODLIGHT SET gives brilliant, even illumination over a wide area. It is easily dismantled and fitted into the robust steel carrying box when not in service. Both sets are supplied with a NIFE Nickel Cadmium Alkaline Battery.

For further details, please send for lists 1050 *and* 3750.

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

N43

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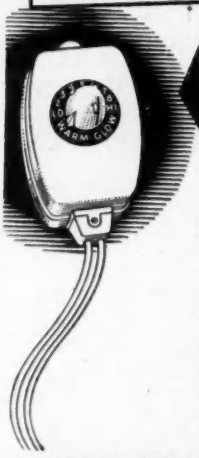
with FINGER-TIP BEDSIDE CONTROL



VIGILUX *Electric* BLANKET

PAT. Nº 671239

THE ONLY BLANKET CONTROL WHICH IS INFINITELY VARIABLE, SELF-COMPENSATING, AND SENSITIVE TO BED AND BODY TEMPERATURES.

★ **The VIGILUX (Regd.)**

Has all the luxury features of the Warm-Glow single-heat Blanket—**plus** finger-tip bedside temperature control, and many other well engineered refinements, such as 2-pole switching, dial illumination, etc. THIS IS THE BLANKET YOU'VE BEEN WAITING FOR! The full size woollen blanket is a part of the bedclothes and is **not** removed before retiring. Its low loading design and waterproof element give it a higher safety factor than any other blanket on the market.

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★ **WARM-GLOW SOIL HEATERS**

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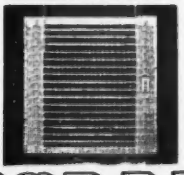

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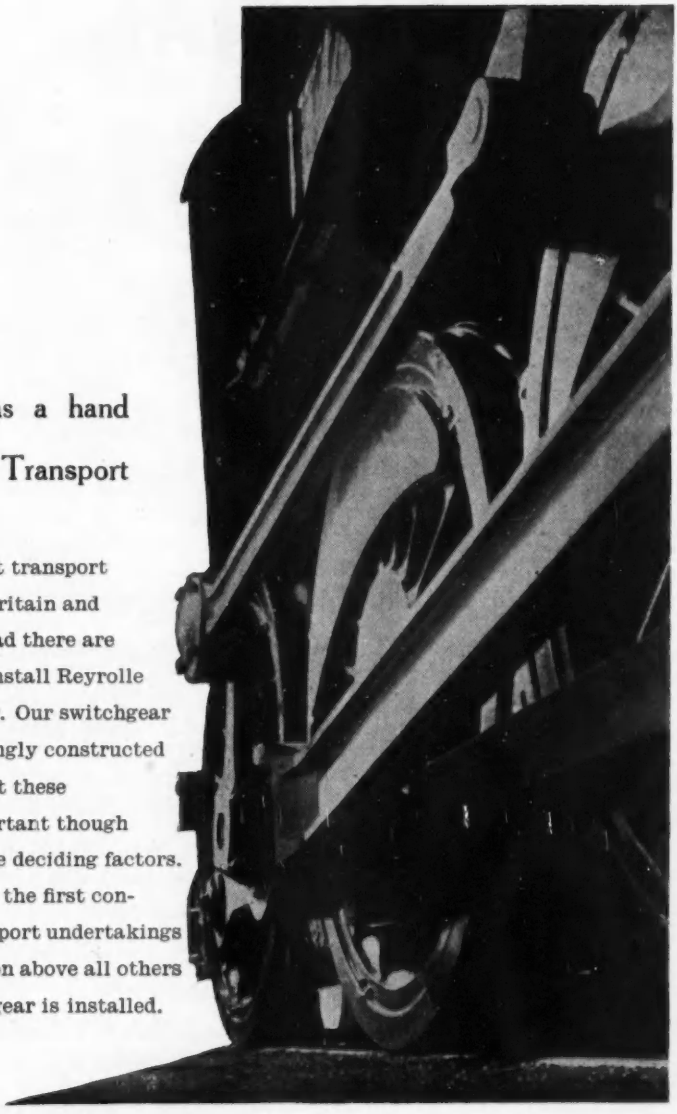

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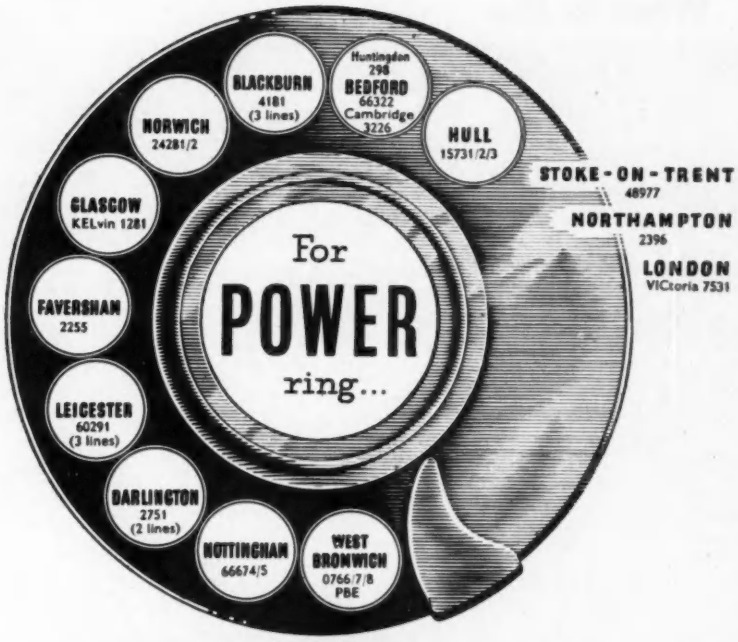

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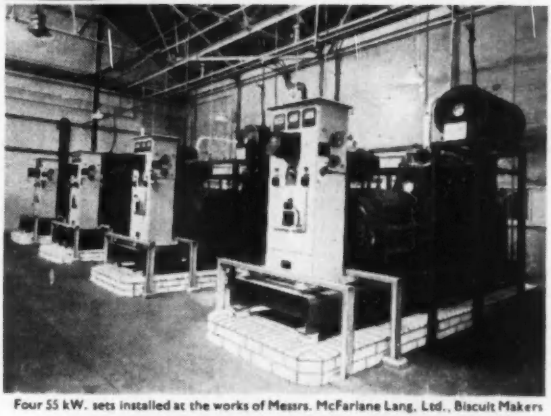

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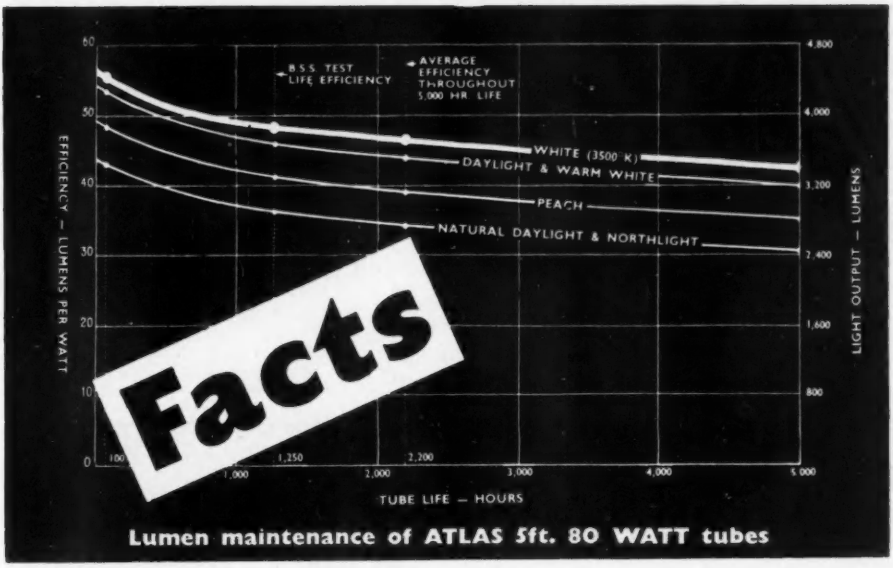


Lumen maintenance of ATLAS 5ft. 80 WATT tubes

This graph proves more clearly than any words that ATLAS 'double life' fluorescent tubes *do maintain* their brilliance. The curve and the figures given below are based on the performance of many thousands of 'double life' tubes checked for lumen maintenance in *actual service* as well as in Thorn Laboratories. This 'lumen maintenance' is shown below as the light output at 5,000 hours, expressed as a percentage of that at 100 hours.

The figures quoted are extracted from the ATLAS folder AL/115 — you should have a copy.

	80 w. tubes	40 w. tubes	30 w. tubes	2' 40 w. tubes	20 w. tubes	15 w. tubes
White	76.4%	81%	76.5%	72.5%	80.5%	72.5%
Daylight, Warm White ...	75.4%	80.4%	75.5%	71%	79.5%	71%
Peach	73%	80%	73%	71.5%	80%	71.5%
Nat. Daylight, Northlight ...	70.6%	77.5%	74.5%	67.5%	78%	70%

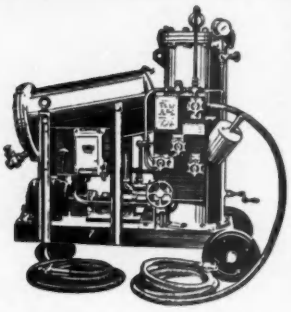
ATLAS "double-life" fluorescent tubes

THORN ELECTRICAL INDUSTRIES LTD · Lighting Division · 233 Shaftesbury Avenue · London · W.C.2

326

Cold Filtration of Insulating Oils

The insulating value of used transformer and switch oils by one passage through the Metafilter is raised to a higher break-down voltage than the new oil.
The plant is purely mechanical and extremely simple in operation.



Capacities from 20 gallons to 1,000 gallons per hour.

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ELECTRICAL ACCESSORIES

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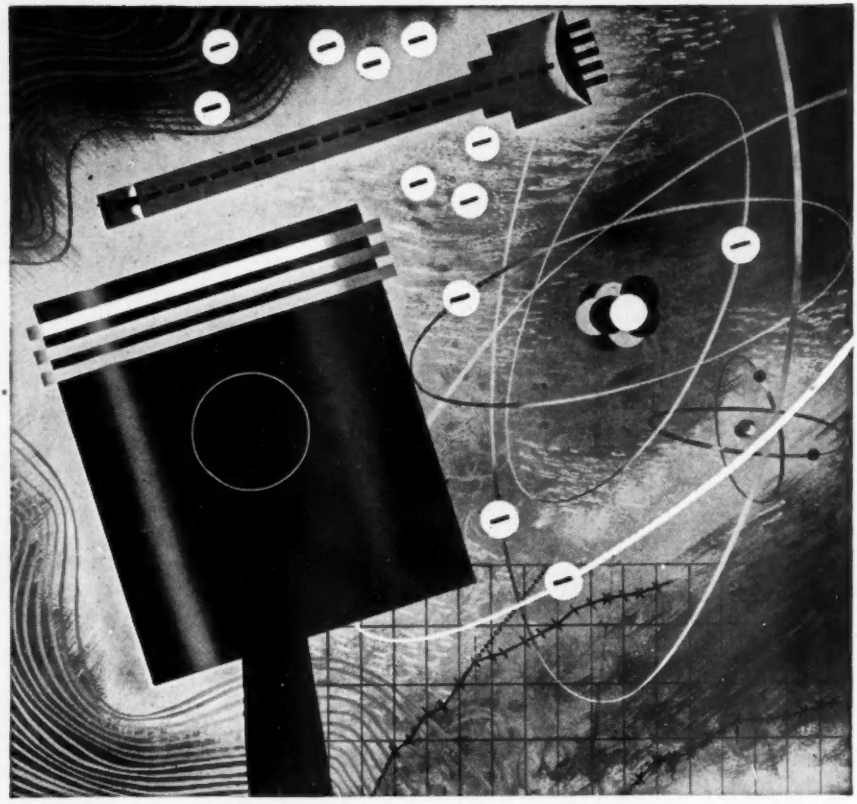

Atomic detectives

Metal wear is no new problem, but its study at Thornton has been transformed by the use of radioactive isotopes. These are the atomic detectives of science. They record the slightest fingerprint of wear.

In a test now proceeding, a radioactive piston ring fitted in an experimental engine is supplying valuable data on the *rate* of wear. Wear on the piston ring removes minute particles of radioactive metal which are carried away by the lubricating oil. As the oil returns to the sump of the engine it passes a Geiger Counter, which records the presence of radioactive metal.

In another test, a length of wire is drawn vertically through a tungsten carbide die which has been made radioactive. Normally, the wear on the die using different wire-drawing lubricants is measurable only when about two miles of wire have been drawn, but with the aid of radioactive tracers, which are transferred from the die to the wire, the radioactivity of the wire can be assessed by means of a Geiger Counter. By this method it is possible to measure 0.00000002 grams of die wear per foot length of wire.

These are two examples of how work on the atom has given into the hands of Shell lubrication experts research aids that will give answers in weeks instead of years. To you that means even better performance from even better Shell lubricants. To industry it means a narrowing of the time-lag between the invention of new machines and the development of lubricants to suit them.

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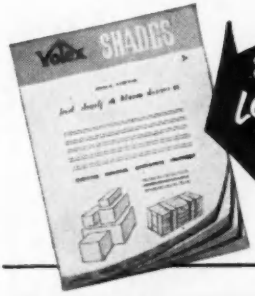
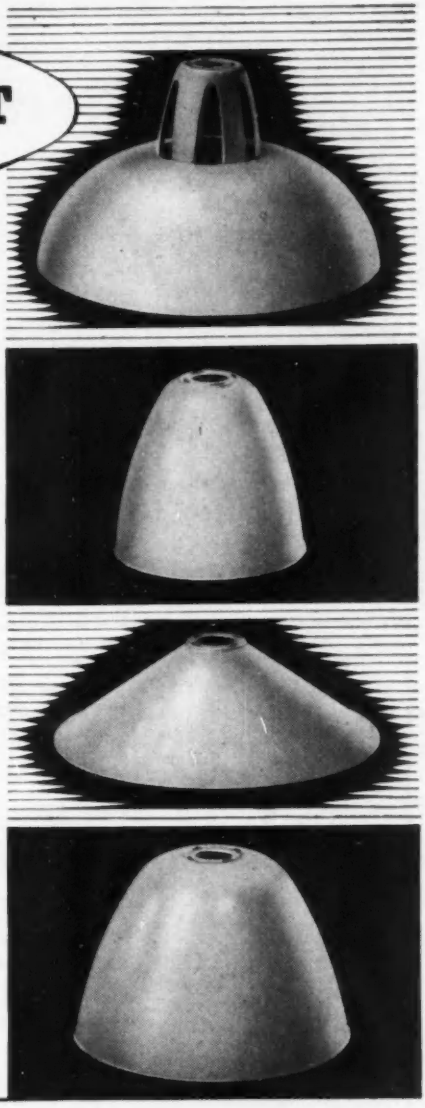


Send for Leaflet giving full range



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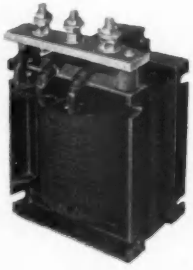
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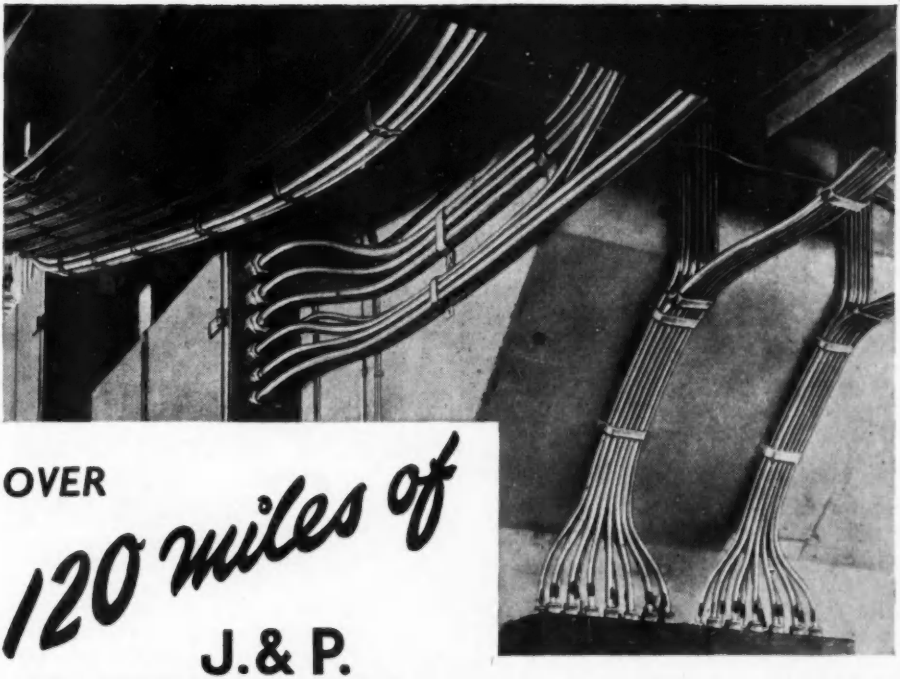

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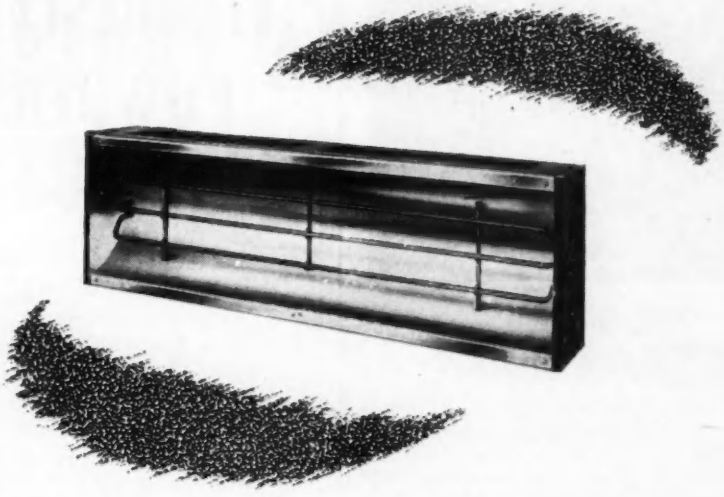

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INFRA-RED HEATING

The Metrovick element projector unit is proving a valuable aid to production in processes where the application of heat is concerned; in many cases processing times are reduced from hours to minutes. The units are made in standard sizes, 18 in., 24 in. and 36 in. long and special lengths can be supplied to suit manufacturers' individual requirements.

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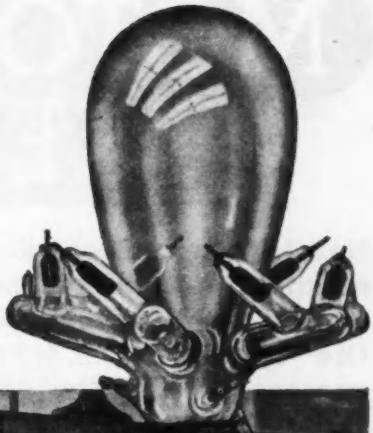

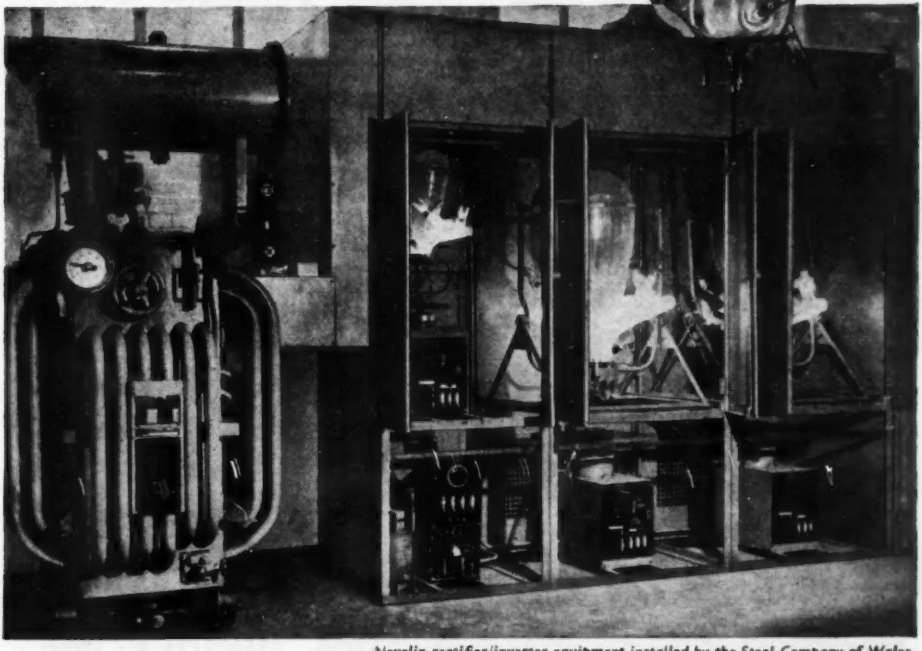

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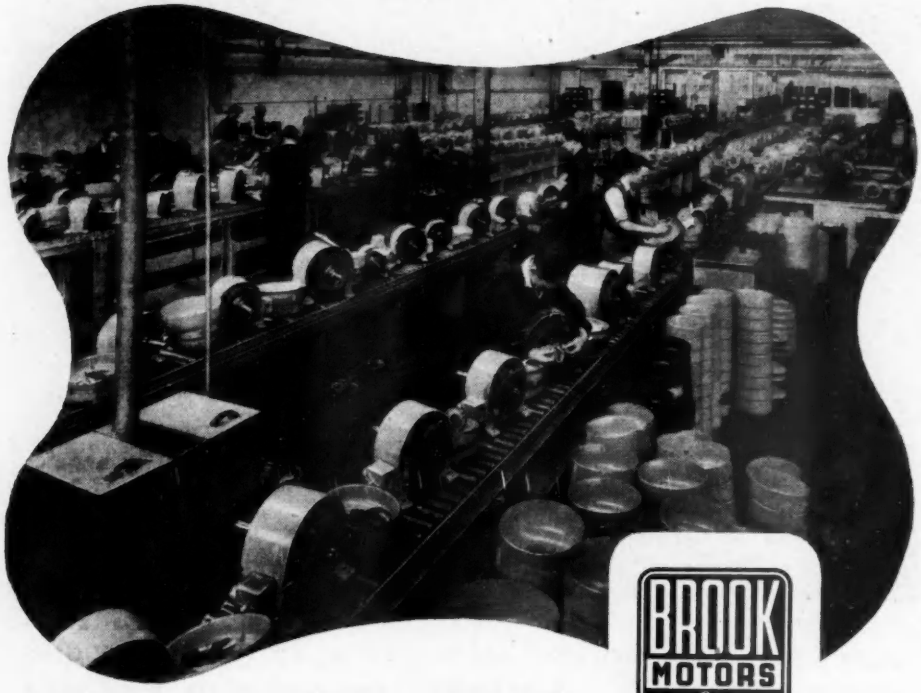

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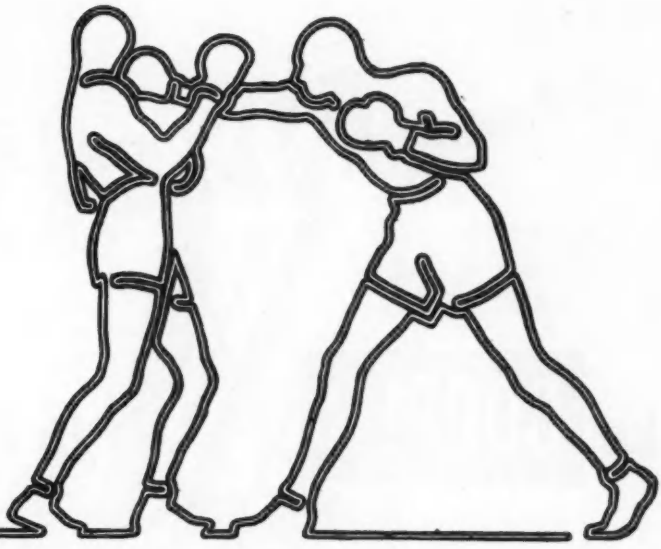

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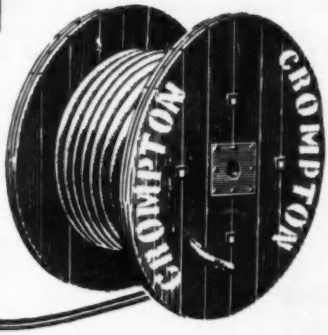

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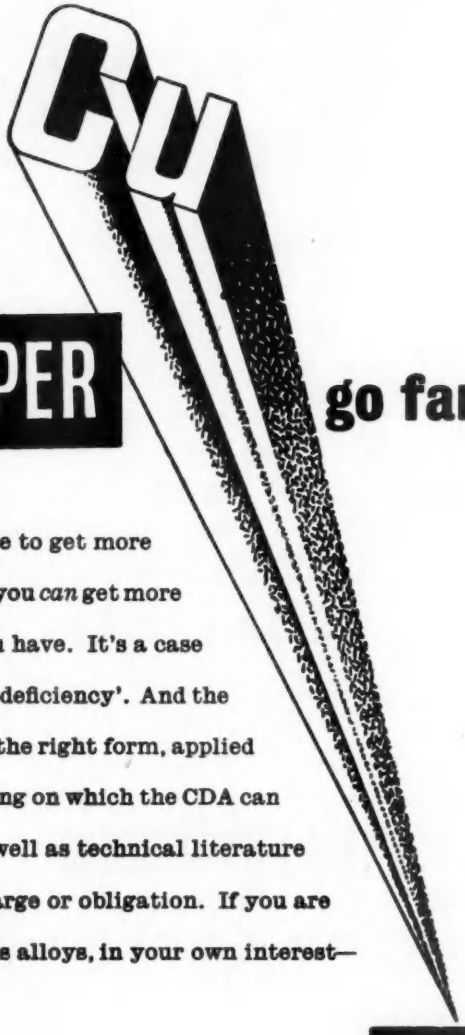

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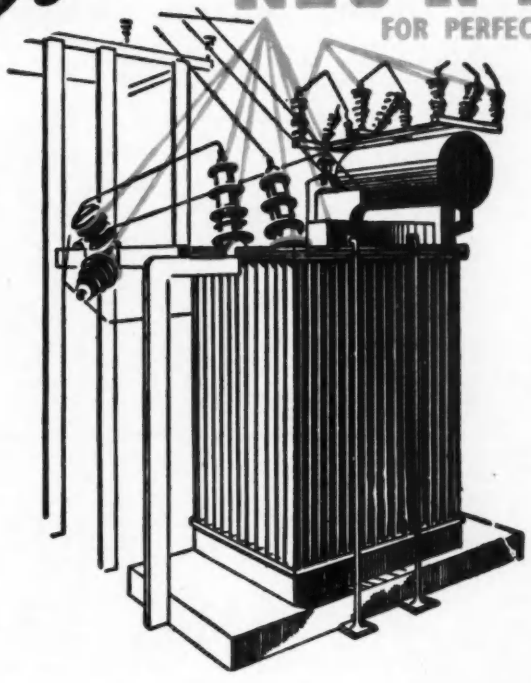

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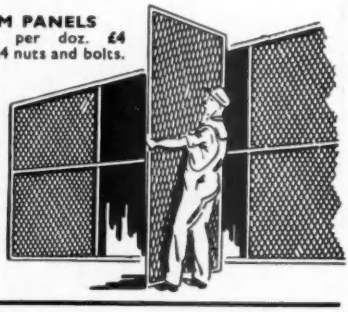

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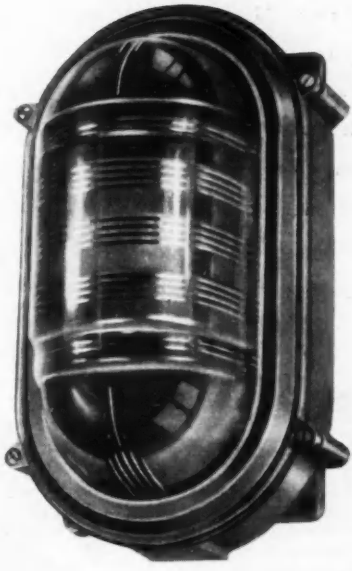
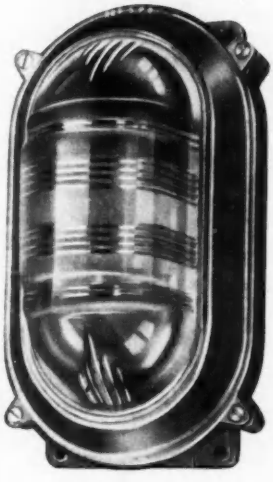


60 WATT
LIST No. SP.6



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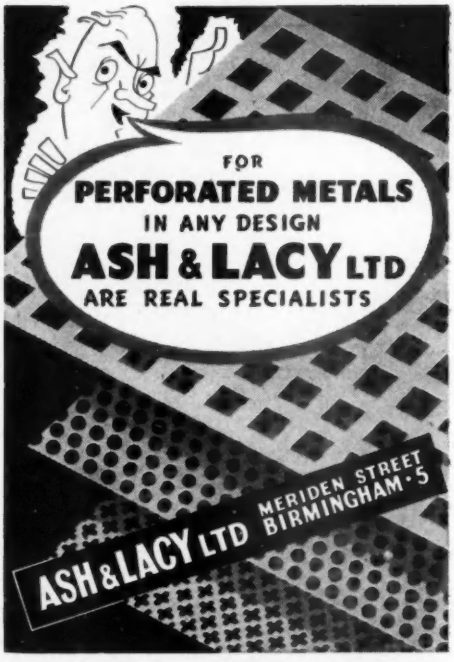

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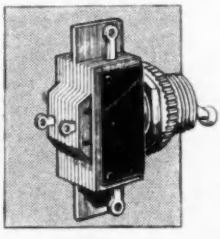

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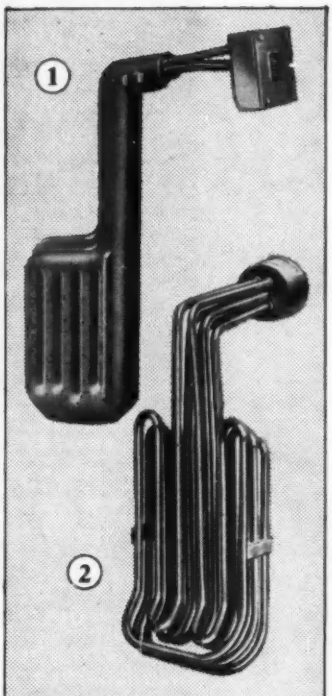

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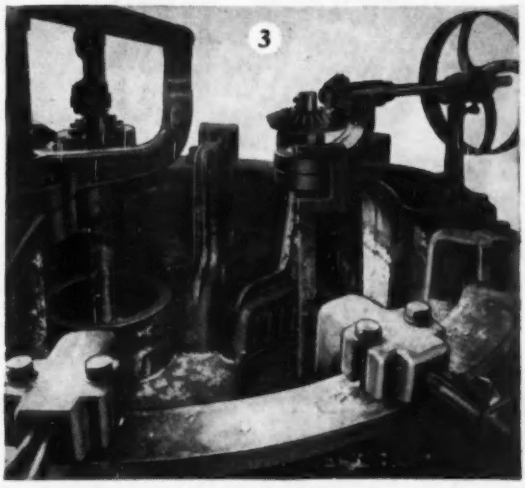

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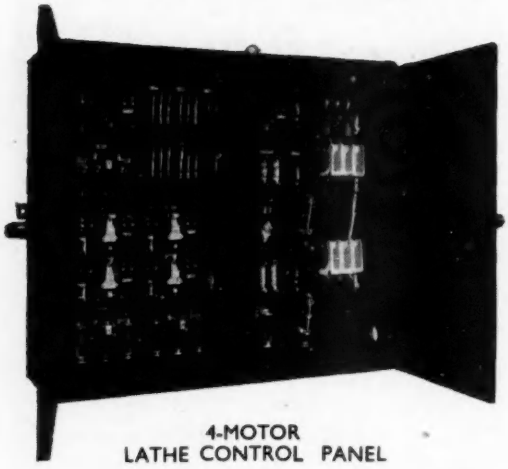

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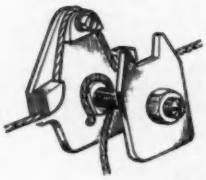
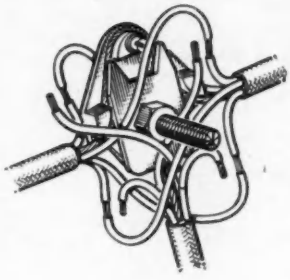
This is the strand (catenary)



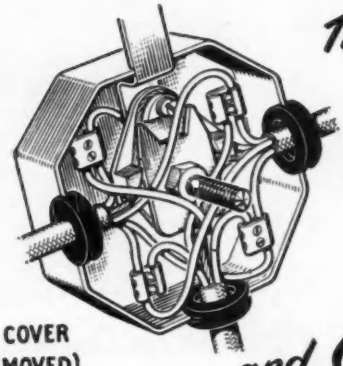
That's held in the clamp



Between the conductors (no cutting of cores)

That fit in the box

That's part of the system



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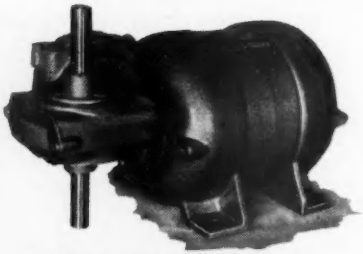

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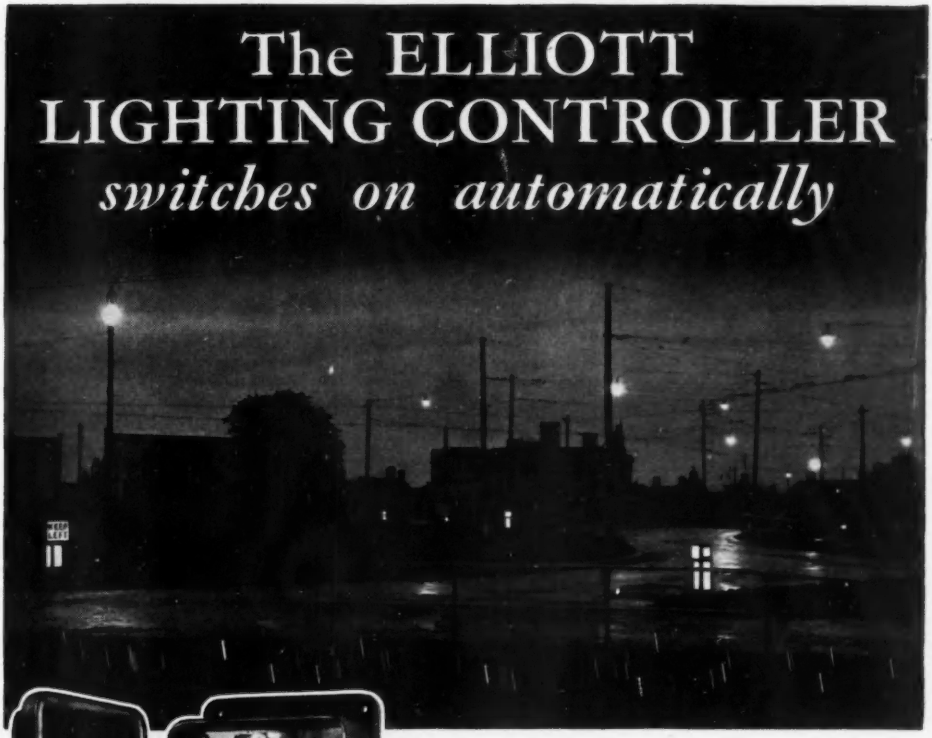

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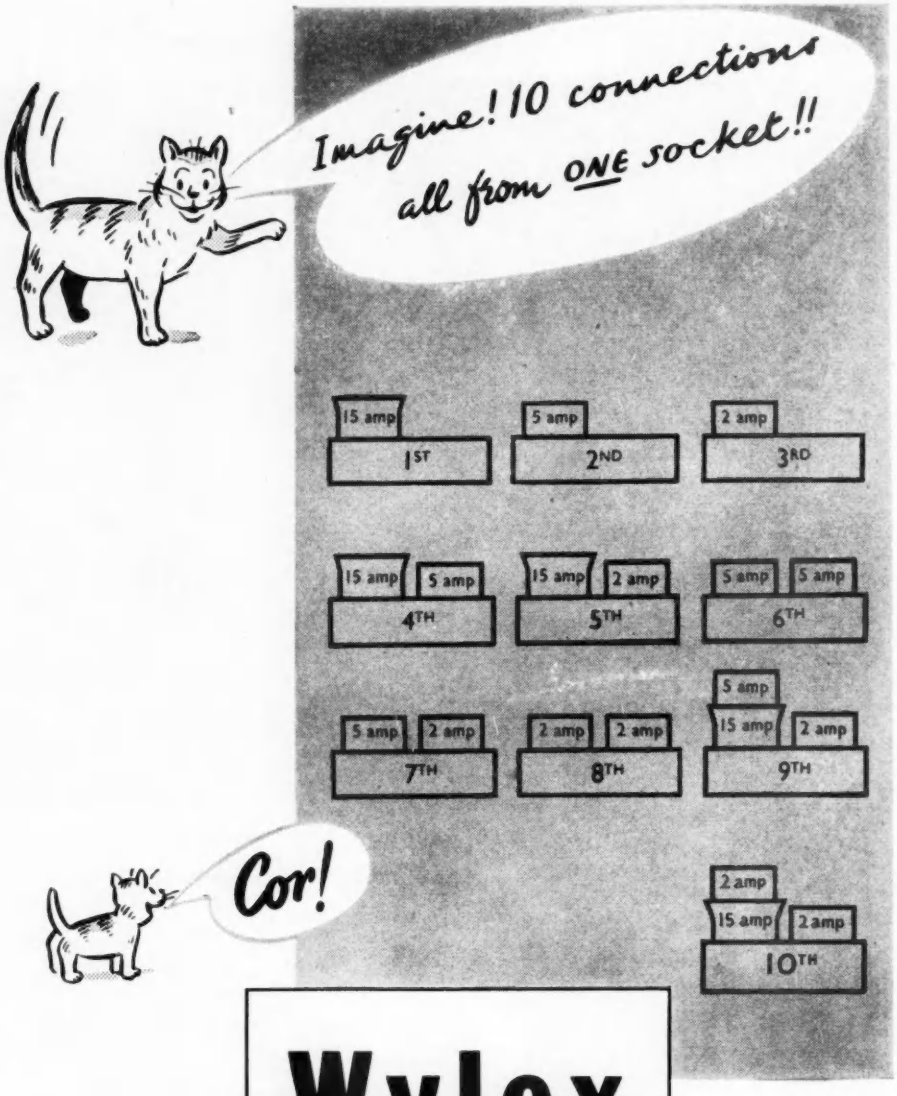

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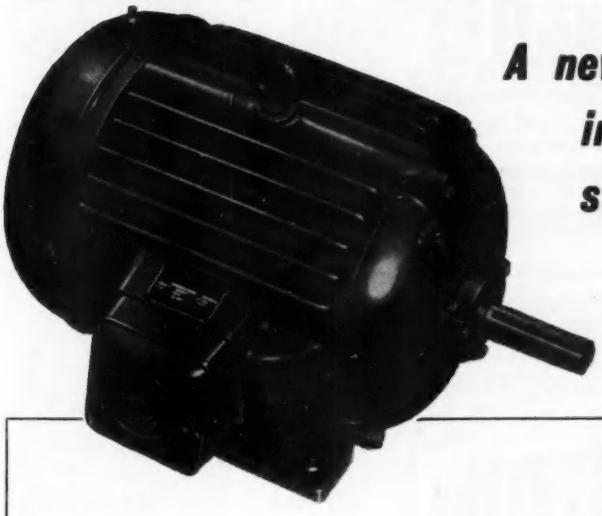

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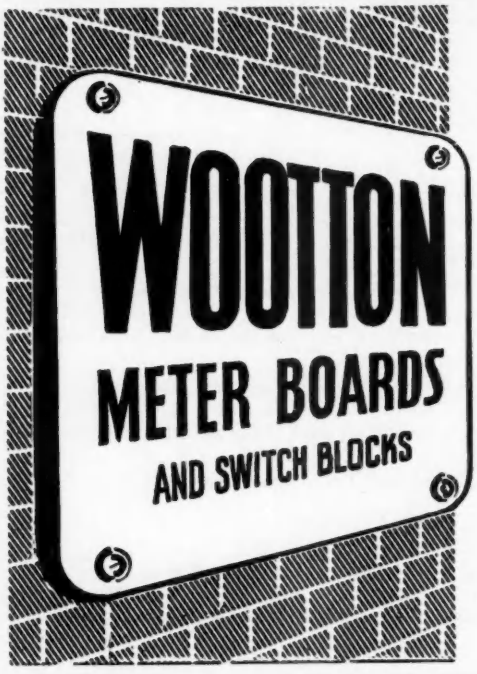

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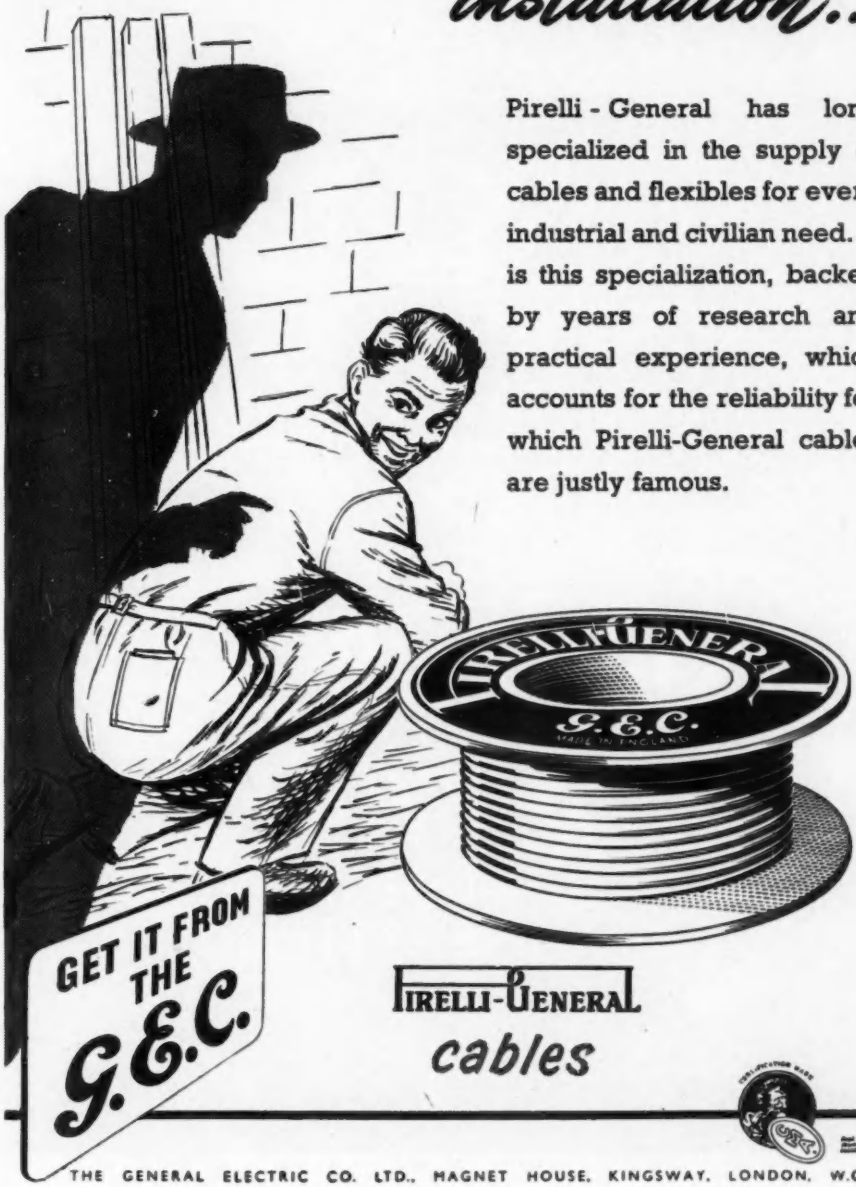

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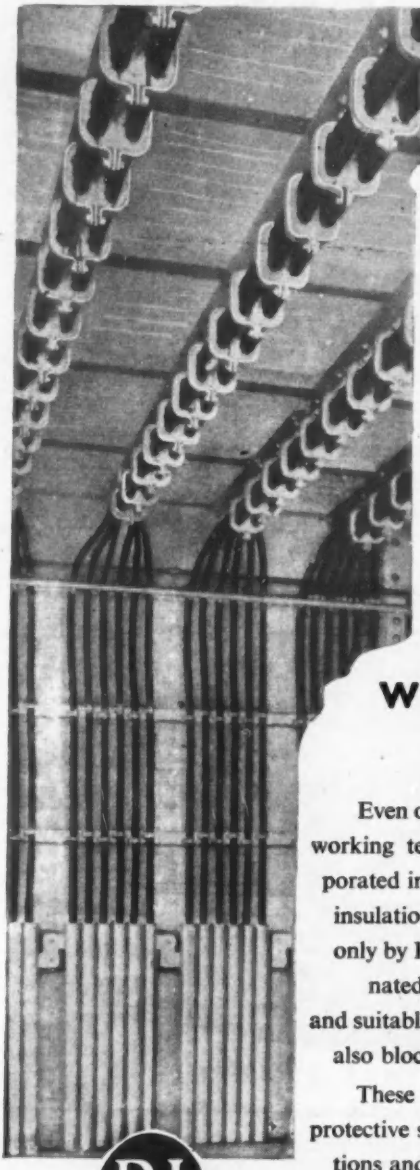

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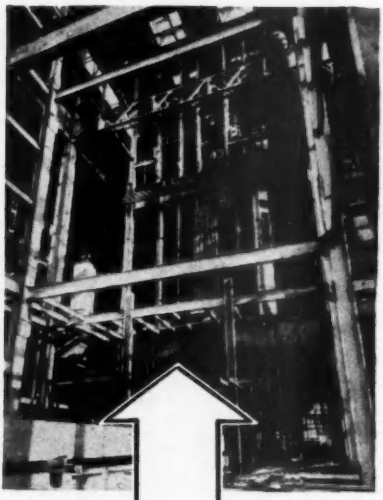

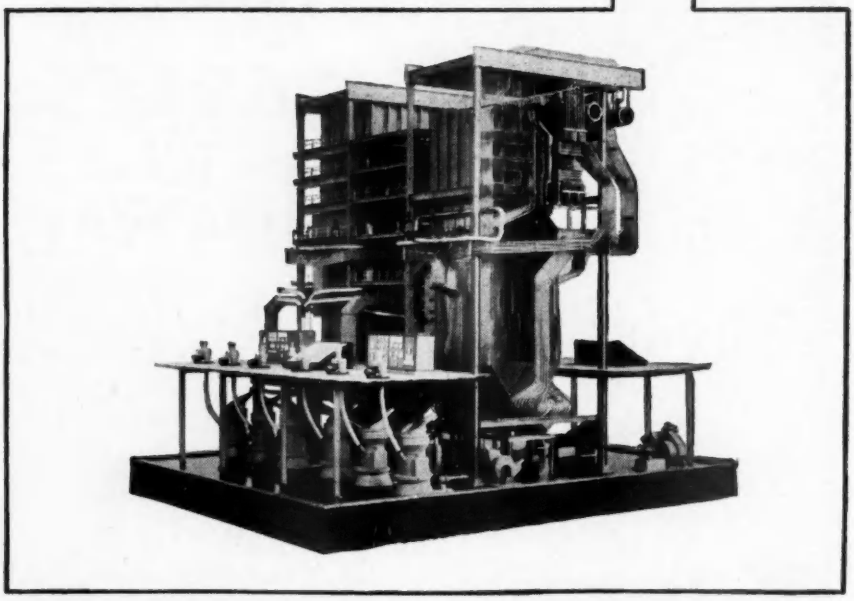

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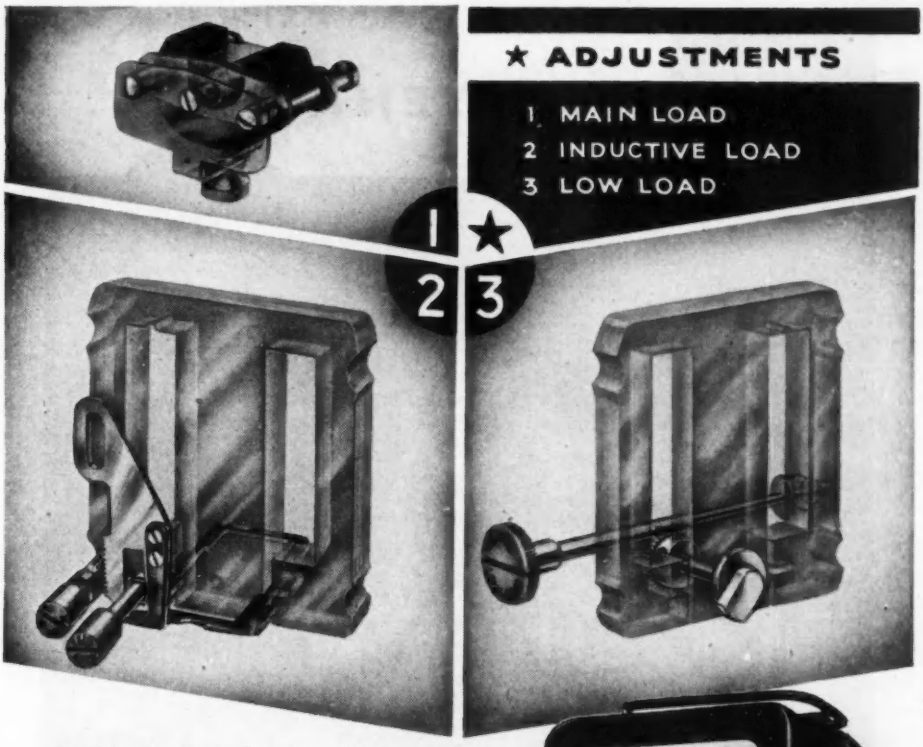

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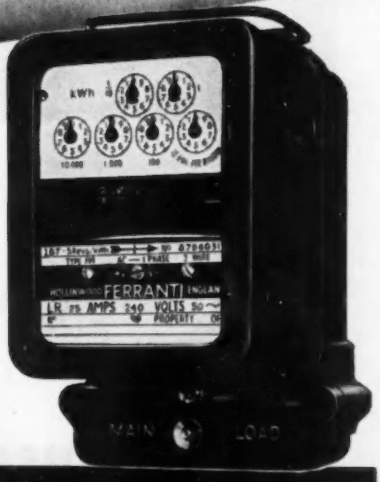

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ELECTRICAL TIMES

Volume 122 No. 3187 4 DECEMBER, 1952

PUBLISHED EVERY THURSDAY

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ESTABLISHED 1891

SUBSCRIPTION RATES.—United Kingdom and Overseas £2 10s. 0d. per annum. Canada C$7·50c., U.S.A. $7·50c. per annum. Subscriptions are payable in advance and may commence with any issue throughout the year. Overseas subscriptions may be paid to The Electrical Times Limited by banker's draft, cheque or international money order. Single copies are obtainable, price 9d. each.

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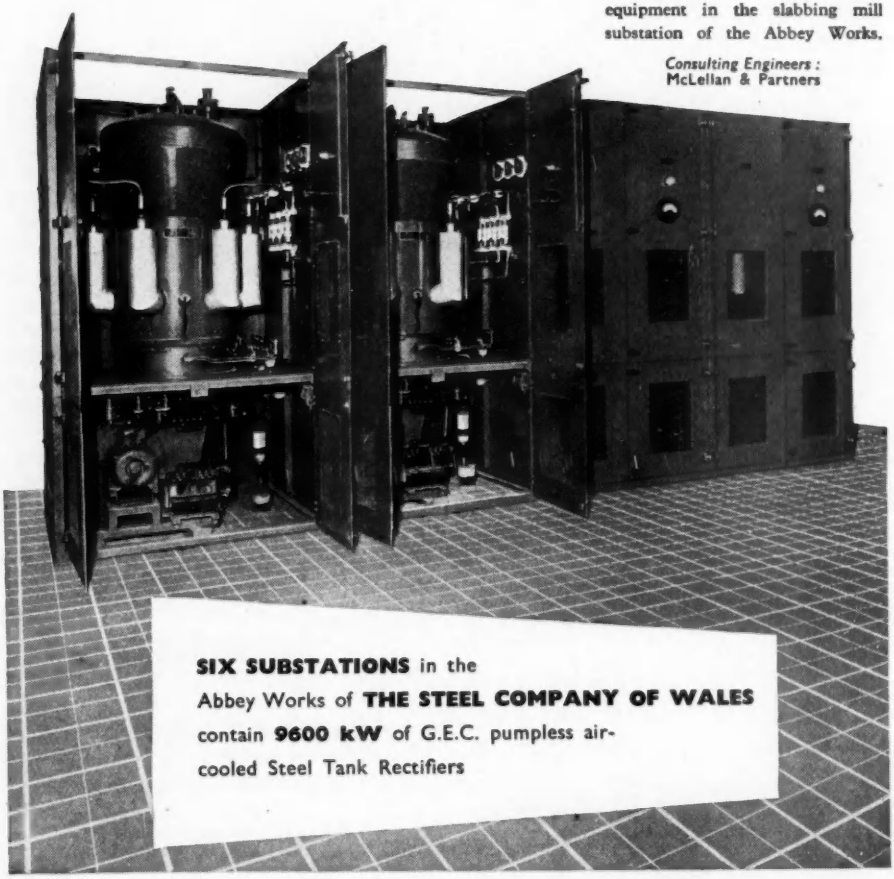

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Editorial

COMPLICATED INTERFERENCE

PUBLICATION of regulations requiring interference suppressors to be fitted to the engines of new motor cars has shown that the P.M.G. intends to make full use of the powers conferred on him by the Wireless Telegraphy Act, 1949. Yet the complicated form that the new regulations take must give rise to doubts about the practicability of producing corresponding requirements for domestic appliances. The case of engine ignition interference was a comparatively simple one. There is fairly continuous radiation of energy affecting mainly television reception, and an extremely simple and inexpensive form of suppression is available. In spite of this, although the general legal requirements of the new regulation are dealt with comparatively briefly, the technical schedule that follows, defining the measurements on which these depend, is about three times as long. In contrast, in the case of most domestic appliances, a much wider frequency band will have to be considered, and the measurement technique adopted will have to take account of mains-conducted h.f. interference, in addition to the effects of radiation from connected wiring. Amongst other major problems, there is the important question of safety, which with capacitors connected between frame and line wiring a common component in suppression equipment, is likely to be highly controversial.

LINES ACROSS EUROPE

A FEW weeks ago we reviewed in this column a United Nations E.C.E. Electricity Committee survey which seemed to kill any idea that a European grid was a practical possibility. Now comes another bulletin from the general secretariat of the same Commission, which, at first reading, seems to regard the prospects as far brighter. It sees an effective pan-European network growing up without any conscious plan, albeit without any central and independent load dispatcher. Full development into an integrated centrally operated scheme is set aside for discussion in the future, when the need for common control has been demonstrated. Two so dissimilar approaches in official documents of the same organisation are somewhat difficult to reconcile. Probably, though, the difference is largely one of emphasis. The earlier report concerned itself mainly with firm one-way supplies of power, which it considered as practicable on a large scale only from Norway and Yugoslavia. The more general bulletin which has now been issued gives more attention to exchanges of energy which can even out daily and seasonal fluctuations in generation. Moreover, from the general nature of its concern with the wider problems of Europe's economic future, it attaches more weight to the necessity of developing the widest use of water power in the face of what it regards as an impending general coal shortage.

DOMESTIC STANDARDISATION

B.S. 816 is what may be termed a residuary standard; it lays down general conditions of quality and safety for domestic appliances and accessories which are not covered by an individual standard. For this reason, the new revision recently published gives a useful review of the advance in respect of safety considerations since the original document appeared in 1938. There are three main alterations in a standard which has in general been little changed. The first is the adoption of a more realistic attitude towards earthing arrangements, evidenced by provision for an earth continuity test at a current high enough to seek out any inefficient contacts on which reliance is being placed. This is a recognition of a general trend that should be more widely adopted. Next comes the demand for a

cord-grip, with the added requirement of a test of its mechanical effectiveness; a reminder that such a feature, for long mandatory in other countries, is now appearing in many standards here. Finally, there is a definite restriction of the types of connector that are acceptable in the construction of portable appliances. All these changes mark important advances in the general standard of electrical appliance design, and they provide some measure of the progress that has been made in the last decade. Perhaps, however, the full significance only comes out when it is remembered that compliance with B.S. 816 is a requirement of the I.E.E. Rules.

ANALOGUES AND ACCURACY

THE electrolytic analogue, which uses a conducting medium to simulate electric stresses, enables field problems to be solved in an easy and convenient manner. This technique was originally developed to simplify the difficulty of plotting electron distribution in thermionic valves. Since the war, the system has been extended to cover much wider fields. In common, however, with most analogue methods, certain errors and distortions are encountered in the conversion from the primary system of units and variables, to the analogue. Again the methods of measurement in the analogue themselves introduce further errors. That these errors, in this particular case, can be reduced to extremely small proportions was well emphasised by Mr. MacDonald's paper presented to the I.E.E. last Wednesday, where an accuracy of $\pm 0{\cdot}1\%$ was claimed as a possibility. Such limits make electrolytic field plotting a most powerful weapon in the armoury of the designer. In fact, for most design work, such high accuracies are swamped by the errors already present in the available design data. This latter point was well shown in the companion paper by Dr. Sander and Mr. Yates, in which the method was applied to specific problems encountered in the design of transformers. It remained, however, for speakers in the discussion to point out that fundamentally the accuracy of the method lies in the craftsmanship of the maker of the analogue model. Applications involving the representation of switchgear, and similar equipment where materials of different permittivity are employed require workmanship of a particularly high order.

COLONIAL ALUMINIUM

LAST week's White Paper on the scheme for developing the Volta River, on the Gold Coast, has carried a stage further a project which has a double claim on the attention of electrical engineers. The growing use of aluminium as a cable metal, discussed at length in the ELECTRICAL TIMES last week, gives the industry a direct interest in any new major source of supply of the metal. The proposed ultimate production of 210,000 tons/year certainly puts the Volta scheme in this category. Beyond this, there is the intrinsic importance which must attach to any plan for electrical generation involving the installation of some 600 MW of hydro-plant, and the creation of a 2,000 square-mile lake on one of Africa's largest rivers. The scheme is one which is likely to affect greatly the prosperity of the Gold Coast, and there is evidence of wise foresight in the reservation of 50 MW of power for the eventual supply of electrical energy for general public needs.

ELECTRIC APPETITE

GYMNOT is an electric eel, and in his natural habitat the most up-to-date of his kind. Equipped with a built-in humane killer operating on the approved electrical shock method, he boasts still one further refinement. This is a detecting system sensitive to high conductivity objects, which for many millions of years were represented for him solely by the small and succulent fish on which he fed. Civilisation has changed all that. Introduced into inhabited regions, Gymnot continues to eat anything with a low ρ. Now, however, fish are no longer the only sea bed objects meeting such a specification. That well served stomach commonly contains an admixture of stray metal. A well-trained shole would be an acquisition indeed for the scrap drive!

Meteor

SMALL MOTORS

some modifications in detail that will appeal to the maintenance engineer

are suggested by KARL WILKINSON

THIS is an age of research, of new discoveries, of re-application of old ideas and of unlimited and unknown possibilities in the future. It is the age of the scientist, the physicist, and the chemist and of methodical and painstaking investigation in the newly opened field of study. New devices are being placed on the market every day and the technical journals are busily recording their advent.

While we appreciate the brilliance of many new ideas in the electrical world generally, we must deplore the lack of research in the design of existing machines and apparatus that have served, in the main, quite well for many years and *which have not been superseded by new forms*. Such is specially the case in small motors. Apart from various modifications, they are still fundamentally the same as they were in our youth. The problem here is not the design of new motors but the improvement of small details, so often overlooked or entirely ignored by some makers who still persist in using constructional methods that are bad, or questionable at least. Similarly most new apparatus must, by necessity, make use of existing sound engineering technique of established value. We should not allow the novelty of a piece of apparatus to prevent us from appreciating good constructional details nor of criticising them when they are bad.

New Materials

We realise, of course, that the use of a new material may necessitate a radical departure from pre-existing workshop practice that has never had to cope with such a problem. The widespread use of plastics illustrates this point. Plastics—a misleading term as most of those used electrically are far from being "plastic"—demand a modification in design that may be essential for their manufacture. For example, the taper of a moulding to permit extraction, the care to be taken in heavy mouldings to prevent shrinkages or distortion generally, the difficulty of making the top and bottom "forces," etc., all modify a normal design.

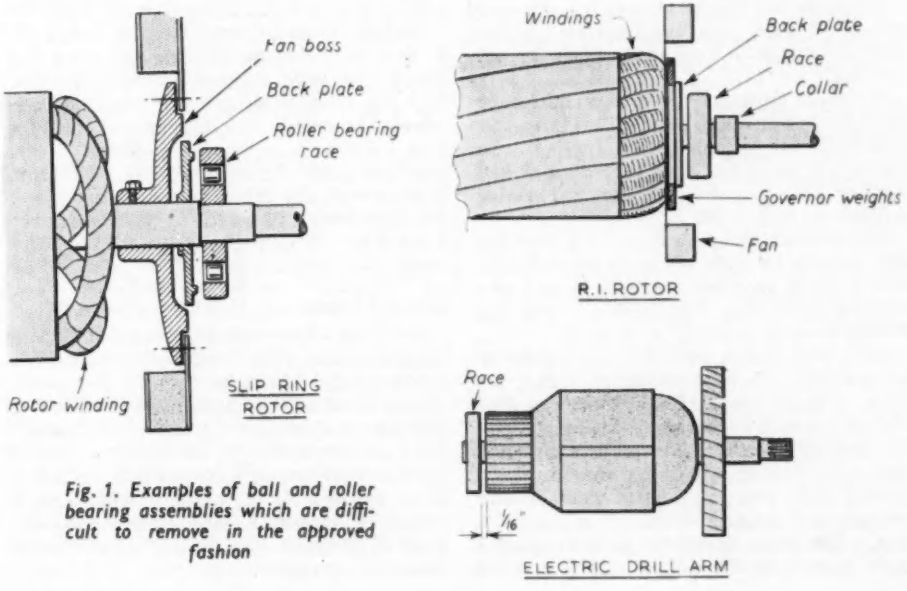


Fig. 1. Examples of ball and roller bearing assemblies which are difficult to remove in the approved fashion

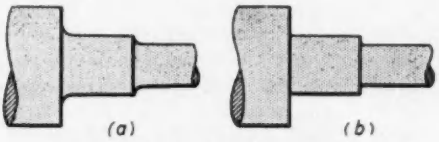


Fig. 2. Radiusing is important on shafts

Similarly the sintered materials used for self-lubricating bearings require a workshop technique that is essentially different from that using the old method.

Ignore for the moment such special considerations as new materials with their associated technique and discuss the basic engineering practices that still serve to construct the bulk of the new machine, which surely merit a little of the attention given to the article as a whole.

Ball Races

Consider the fitting of ball races, such common articles that they are apparently beneath the designer's notice. How many races are fitted that are extremely difficult or even impossible to remove correctly? The ball race makers describe in their leaflets how a race should be removed: by pressure on the outer race for a housing and by pressure on the inner race for a journal. In very many cases it is impossible to do this. We can quote as an example the bearings fitted to certain armatures and rotors where the back plate is too close to either the windings or to a fan so that no normal—or abnormal for that matter—puller will even engage the outer race and certainly not the inner race where the pressure should be applied. See Figure 1.

In both of these cases the makers advise the use of the ball race back plate, bolted to a puller plate in order to remove the bearings. So simple, but the race is often too tight a fit and the back plate fractures even when the bearing is expanded by hot oil.

The journals on which the race is fixed are often incorrectly made. So many are machined with a sharp shoulder, Fig. 2(b), instead of a round corner as (a). The sharp corner invites a fracture under arduous conditions.

While dealing with shafts on small motors we can examine the construction as found, see Figure 3(a) and compare it with another method already in use on similar machines, Figure 3(b). The first case shows a shaft with four lands and two journal sizes while the second has a parallel shaft with no shoulder, giving greater strength and extreme simplicity of construction. The shaft, centreless ground, has the stack pressed on the splined middle and the spline also holds the two tubes, which can be split rolled, in position. The slight reduction on the shaft at C(3b) is a distinct advantage as it avoids damaging a P.B. or white metal bearing when the rotor is withdrawn for servicing.

This last remark is perhaps a key to the problem. All pieces of apparatus must be overhauled at some time and the designer *must* consider the fitter, so often a maintenance man. A well designed piece of apparatus should be easy to assemble and dissemble and moreover

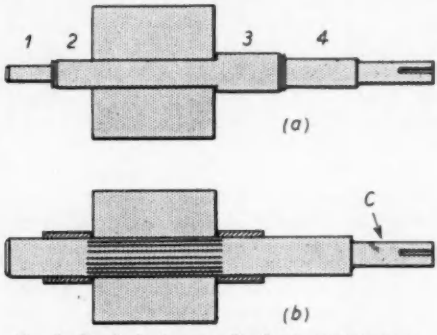


Fig. 3. Shaft design can facilitate maintenance. Shaft (b) is simpler and more convenient

be self-explanatory if possible. If the dismantling is not obvious some help could be given by, for example, stamping LH on a left-hand thread when the hand is unknown.

Many English designers will probably disagree with (3b) which happens to be a common American method. Apart from its simplicity it has the advantage of using the same size bearing at each end, a practice so often departed from in this country and which is often unnecessary. The difference in cost of a $\frac{5}{8}$ in. rolled white metal bearing instead of, say, a $\frac{3}{4}$ in. to match the other end is negligible and the repairer can halve his stock of spares. Similarly with ball races. In small machines there is no adequate reason why the two races should not be the same.

End Plates

We often wonder why provision is so seldom made to facilitate the removal of end plates on a motor or for that matter of any two pieces closely housed. End plates are by necessity a light press fit on the main body of the motor. On many machines it is impossible to remove them without causing some minor damage that either impairs the fit or appearance. Some makers certainly fit screwdriver slots; why not in all cases? Even more trouble is met in other small motors where the end plates or the brush

cover are steel pressings that house over a male spigot on the field assembly. These can be the very devil and a little rust, or corrosion where a steel pressing fits over an aluminium body may defy any normal attempt at removal and the exasperated fitter, with a few well chosen words, drives it off with a punch and is disgusted with the damage entailed.

Larger end plates on bigger motors are easily removed by the method adopted by at least one maker. The end plate (Fig. 4) is provided with four tapped holes at X. The housing bolts are removed and re-inserted in these tapped holes so providing a self-contained pulling device. An excellent arrangement.

Many electrical devices could profit by the design used in the magneto world where parts, otherwise difficult of access or removal, are fitted with an extractor nut, that is the same nut both holds and removes the part. (See Fig. 5.)

Accessibility

Another example of bad design is found in some electrically driven machines where the motor is partially built into the main casting. For example we have food mixers, potato

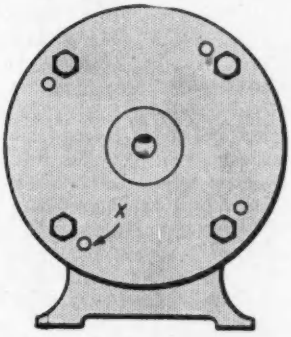


Fig. 4. Tapped holes (x) ease the removal of this endplate

peelers and gearheads where the normal end plate on the motor is replaced by a similar recess in the main casting. This means that the motor cannot be removed and tested *as a separate unit*; moreover the removal of such a motor may mean the prior dismantling of considerable gear. On one machine it means removing a cast-iron base and gear wheel weighing about ½ cwt together with a gallon of heavy oil in order to remove ¼ h.p. motor! Similarly with large industrial vacuum cleaners. It seems such a waste of labour to have to dismantle a four or six stage impeller with associated baffles and housing in order to machine the commutator.

A simple alteration in design would permit the armature to be extracted by the removal of one end plate and one nut, the impeller assembly being mounted on a sleeve. A suggested arrangement shown in Figure 6 is already adopted in some mechanisms.

Fixing

By fixings we mean nuts and bolts. Confusion already reigns in this sphere and what a mixture is found on some machines, Whitworth bolts with non-standard heads, B.S.F., B.A. S.A.E. and A.F. with gas-pipe threads on shaft, brass gas threads (26 t.p.i.) and many others unrecognised by most maintenance men.

The Whitworth thread is to a great extent obsolete but it is still used, even the odd 5/32 in. and ⅛ in. Whitworth are quite common on some machines. Most small jobs can be served with B.S.F. or B.A. in round numbers. (It is easy to get a spare 2 B.A. nut for a terminal box but a 3 B.A. is a comparative rarity.)

Small details can make a vast difference to assembly. For example the provision of a saw kerf in a hexagon bolt head for quick running up with a screwdriver. Here again the designer must not forget that the makers may use a nut runner but the fitter overhauling the machine will have ordinary hand tools. Moreover, a taper lead on a bolt that has to reach, say, a tapped lug at the bottom of a cavity will be a boon.

Other fixings such as round nuts with saw kerfs sunk flush or below level are a curse. The slotted screwdrivers necessary are not normally obtainable and usually have to be made up for the job. Moreover, if the nut is tight the screwdriver must be hardened and tempered before use. These nuts are quite common on portable food mixers and small universal motors generally.

Allen screws are excellent. They hold well, are not easily undone by meddlers and all fitters normally have a set of keys with them. Other similar heads are not so common and can give

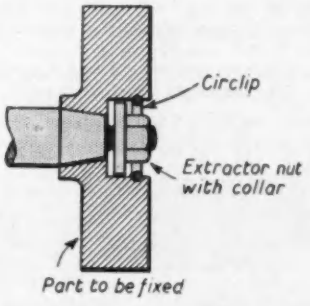


Fig. 5. An extractor nut can help dismantling

trouble because the required driver may not be readily obtainable at every store.

Associated with fixings are washers, plain, spring and lock. It is the writer's opinion that the bulk of these parts fitted to various mechanisms are frequently unnecessary. We can quote a case where one maker uses a long rod, screwed 2 B.A. at each end, and each end with a self-locking nut, a spring washer, a plain washer, and a fibre washer! Nine pieces instead of three normally used. Washers on terminal bolts, especially those in small motors, can be a confounded nuisance. Who has not at some time or other tried to connect up a motor, usually fixed in a very awkward position, and had to juggle with a v.i.r. or flex lead, and either spin an eye or try to wrap it around the screw, under or between two washers and have the mortification to see it pop out as the nut is run down! An improved form of junction box is certainly wanted, together with an adequate earthing screw that is not put on as an afterthought—so often a 4 B.A. screw in the housing with more washers on it. Additional trouble is caused in some motors, for example, refrigerator motors, where an external circuit (or circuits) is coupled in series with the motor. More than one such motor has been burnt out by shorts in the junction box.

The solution to the problem is obviously a form of non-rotating clamp where the lead is placed in a cavity and pinched under a plate. Even this is not the whole answer unless the terminal block is get-at-able, that is the cover when removed must expose clearly the terminal block and not leave it half buried in a cavity.

Circlips

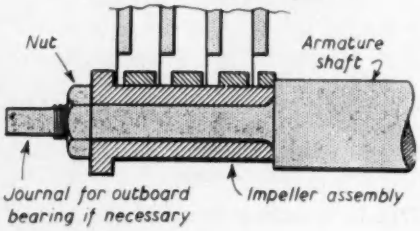
We can also include under the general heading of fixings those somewhat teasing contraptions, circlips. The better types are made like the Greek letter Ω and can be fitted or moved comparatively easily, and if the worst happens an old pair of pliers can always be ground up to open them. The other kind is a simple C either of round wire or of rectangular section. The wire ones are frequently used and their extraction, normally difficult, is at times impossible without damaging the shaft. Figure 7 shows one make of vacuum cleaner armature (made by a firm of world renown) using this device to hold the commutator end ball race and the clip is partly covered by the inner radius of the bearing. Quite apart from the difficulty of removing the clip in the above armature it is moreover absolutely unnecessary, as the normal interference fit of the race is quite sufficient.

We can quote as an example of the rectangular kind those used occasionally to retain short circuiting gear at the commutator end of a r.i. rotor (Fig. 8). These are sometimes $\frac{1}{8}$in. by $\frac{3}{16}$ in. wide and while they can usually be removed by struggling with screwdrivers and a kind-hearted assistant, their replacement necessitates a taper cone jig to refit them if the fitter has not (and he will not have) an opener. Probably the largest number of circlips are to be found on car dynamo armatures which, while only applicable to the automobile electrical world, serve as an example of difficulty. Because of their cheapness and simplicity some kind of clip is required, but they could certainly be replaced with a better type, or alternatively life would be easier if the tools to open them were readily obtainable.

(We cannot, of course, refer to any particular maker when we are criticising design for obvious reasons.)

Closely associated with the junction box is the capacitor unit fitted to so many single phase motors. Does it not seem strange that a well

Fig. 6. Advantages are claimed for using a sleeve-mounted impeller assembly



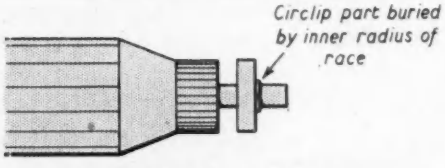


Fig. 7. Circlips used like this are difficult to remove during repairs

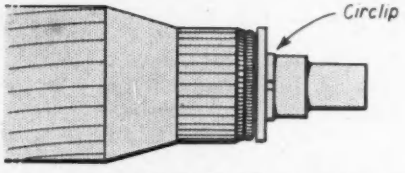


Fig. 8. Replacement of clips in this assembly is also an awkward problem

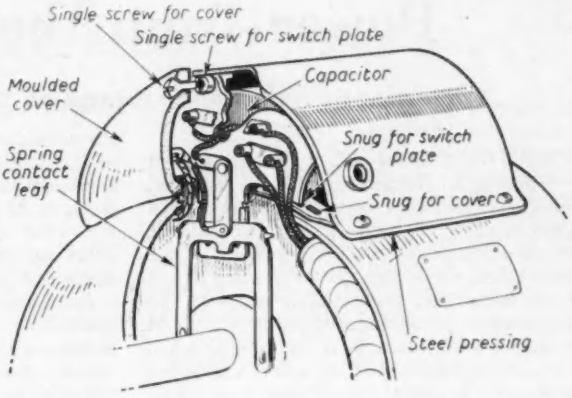


Fig. 9. Suggested arrangement of capacitor on small motor

designed small capacitor motor, embodying all the latest ideas and refinements, has planted on the top a large can that has every appearance of being added as an afterthought? Indeed, many have two cans of different sizes so spoiling any semblance of symmetry. Most maintenance men will agree that the capacitors are a source of bother. By virtue of their projection they are very prone to damage in transit and in fitting and are very apt to come loose and rattle.

The loose lead from the unit to the motor is an additional trouble and is frequently torn off. The writer once saw a van driver collecting repaired motors carrying three in each hand by his fingers through these flex loops and so heaving them on to the tailboard.

Capacitor Motor Improvements

Let us leave criticism and view the problem constructively as far as capacitor start motors are concerned. It would seem that: (1) The capacitor must normally be external to the motor. If it is incorporated inside the motor replacement is more difficult, it will increase the size of the motor and increase the temperature of the unit; (2) The capacitor should conform to the shape of the motor as far as possible and so avoid being a semi-detached and elevated unit. Such conformation will give better appearance, is stronger and will not accumulate dust so readily (Now partially adopted by one maker.); (3) The capacitor cover could also house the terminal block making this readily accessible and moreover avoiding the loose lead so frequently used and avoiding any leads passing through the stator shell. One foreign motor certainly employs a similar arrangement but still uses a circular condenser can.

A suggested layout is shown in Figure 9. It will be seen that the capacitor section is limpet shaped which will certainly modify the condenser itself but as these are frequently pressed flat for some units they could quite easily be curved to fit the space available. The case itself could either be a moulding or a steel pressing with a moulded end cap.

A further improvement could be added whereby the switchplate normally fixed to the end plate is made integral with the moulding on the condenser end. By this means the end plate could be removed without disturbing any connections and still leave the rotor in position, thereby facilitating the examination of this very important mechanism.

In addition, all capacitor units should have their value marked on them and not merely a maker's serial number. This will help the maintenance man when he is testing.

It is desirable that all small motors should be vermin-proof. Mice frequently cause burnouts in motors, usually one-phase motors with internal centrifugal gear which is prevented from operating by these animals. Cockroaches are similarly found on occasions in quite large numbers in some motors, but a screen to prevent their entry is quite difficult in a non-surface cooled motor as any mesh used, to be close enough for its job, would also accumulate dust rapidly and so prevent adequate ventilation. The writer has even known a motor to be burnt out by an accumulation of dormant house flies, but this is an exceptional case.

The accumulation of fine dust such as flour or wood and cement is another difficulty as many motors with normally good ventilation and apparently adequate clearance may yet have a tendency to accumulate dust in certain eddy cavities and blind recesses which may gradually build up and choke the motor.

The centrifugal gear on one-phase motors is very prone to become clogged with dust and oil vapour. These centrifugal switches are normally inside the motor. Some makers fix them outside and this is a practice that could, with advantage, be copied by others as the switch is open to inspection and repair without having to dismantle the motor, a great advantage to the maintenance man as so many failures are due to bad operation of the switch.

Power from the Volta

Aluminium Production to depend on giant hydro-scheme

CONSTRUCTION of a power station having an ultimate capacity of 564 MW, and the creation of a reservoir with an area of 2,000 sq miles, is proposed as part of a scheme for the development of the Volta River, on the Gold Coast. This was announced in a White Paper issued last week, which proposes the development of an installation in the Gold Coast to smelt aluminium on a large scale.

The conception behind the whole scheme is a partnership in which private enterprise will be primarily responsible for the aluminium production, and the U.K. and Gold Coast governments, acting jointly, for the hydro-electric scheme. A public authority, the "Volta River Authority," will be appointed if the scheme is accepted, and will undertake the construction of the dam and hydro-electric works. On completion, the power undertaking will be taken over by an autonomous Volta Electricity Board.

At present the U.K. Government attitude to the scheme is that a preparatory commission should go to work on the project.

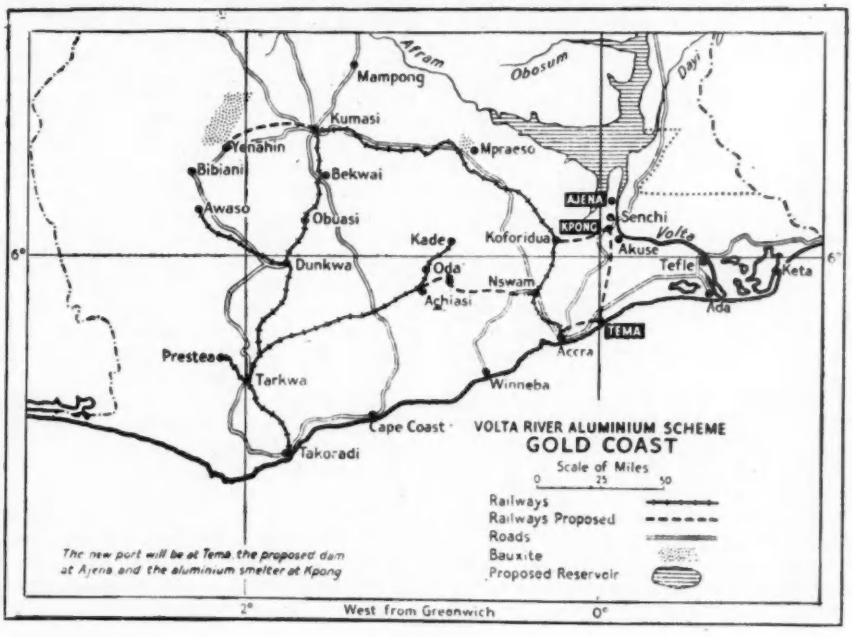
The dam envisaged by the scheme would be sited at Ajena, were the Volta flows through a gorge in the Akwapim Hills. This would raise the water level and create a lake of some 2,000 sq miles. A continuous rate of discharge of 35,700 cusecs should be possible.

Local supplies for towns and villages on the Gold Coast to be allowed at 50 MW. The remaining power available for the aluminium works should permit the production of 210,000 tons/year of aluminium, and reserves of bauxite in the neighbourhood are estimated to be sufficient for about 200 years working at the maximum rate of the smelter.

The cost of the power project is estimated by Sir William Halcrow and Partners as £41 5m. for an initial supply for an 80 MW smelter capacity, up to £49·5m. for full development. This estimate is on June, 1952, prices, and is subject to a ± 15% uncertainty.

It is suggested that the positions of chairman and deputy chairman of the Volta Electricity Board should be full-time appointments.

The main localities involved are shown in this map, but the reservoir will extend farther northwards



Our readers' views . . .

Small Motor Repair

WE were naturally interested in the final article under the title of "Repair and Maintenance of Small Electric Motors" in your issue of November 20. In general we agree with the author's comments.

On the question of grades of brushes, while we have records of some hundreds of grade markings, many of them are of obsolete material, and we ourselves cover all normal requirements with 50-60 grades. In general, we believe other makers have about this number of grades in day to day use.

The author specifically mentions grade markings of a well-known manufacturer, but so far as we can see omits reference, in this connection, to the state of mica on the commutator. Many f.h.p. motors have flush mica, and we feel this may be misleading. With regard to brush holders, it may be that the author is not aware that we, and at least one other well-known brush maker over here, have a wide range of brush holders available as replacements which would avoid the necessity for makeshifts, such as scraping and varnishing or taping as described. As it so happens, on page 67 of this very edition, three of our own holders are shown. This might save some unfortunate folding up brass sheet replicas of worn originals.

A. W. Pelerin

SYNTHETIC CARBON AND ENGINEERING CO.

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Suspension Insulator Loading

IN the ELECTRICAL TIMES for January 31, 1952, you published an article of mine on "Suspension Insulator Loading" in which I erroneously stated that in considering insulator swing, the vertical component of the sag should be obtained using the *still air tension* of the conductor. (Page 195, top r.h. column). I am now persuaded that the *actual tension* resulting from the total loading (wind plus ice) should be used—but with the vertical weight, not the resultant (inclined) load.

The effect is to produce a flatter parabola for the curve representing the limiting condition, which is, therefore, more onerous than my analysis suggested; i.e. less variation in the support height becomes permissible if the condition is to be met.

Accordingly, in the worked out example, the parabolic constant for the fully loaded condition (and the "limiting" curve) becomes $1{\cdot}97 \times 10^{-5}$. The effect on the calculations for the loaded condition are slight. Though the corresponding tension now becomes 3,075 lb., the effect on the angle of swing and the percentage of weight to be carried, is to reduce the first to about $35\frac{1}{2}°$ and to increase the second to about 40 per cent.

L. J. Archer

WIRRAL

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"Historic" Lighting

MAY I draw your attention to the following extract from *The Daily Telegraph* of November 26, 1952.

> "The conference of Commonwealth Prime Ministers which opens tomorrow was originally meant to be held in the new Government offices in Whitehall Gardens. But the Minister of Works, Mr. Eccles decided that their design and lighting were ill-suited to a historic meeting."

Assuming that in a modern building the lighting installation will be in accordance with modern practice, perhaps some of your readers would be able to advise on "Historical Meeting Lighting." Perhaps the Minister would advise lighting of great antiquity as being suitable for such a meeting. Furthermore, it would appear that the I.E.S. should investigate what visual task is involved in the work undertaken at such a conference, to enable guidance to be given to lighting engineers who may be called upon to illuminate Historic Meetings.

Ronald W. Marsh

ROMFORD

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Street Lighting

I HAVE read with interest the letter from Mr. C. F. Harding, of Wolverhampton, in your "Readers' Views," in the issue of the 13th instant, and confirm his statement that it would be much more preferable if each light were screened and that a series of pools of light thrown on the road would be a great benefit to motorists for night driving.

I would mention a stretch of road, known as Lincoln Road, between the Great Cambridge Road and High Street, Ponders End, where this

type of lighting is adopted and, although the illumination might be increased in brilliancy somewhat, I have always found it a most comforting stretch of road on which to drive at night, whether in dry or wet weather.

A. P. Brown

LOUGHTON, ESSEX

Voltage Regulators

I WOULD like to make some comments on the criticisms of the moving-coil voltage regulator and the astatic voltage relay in Mr. Jenning's article on "Automatic Voltage Control" published in your issue of Nov. 20.

Wave-form distortion in the automatic moving-coil voltage regulator is negligible under all normal loading conditions. For extreme cases where the load current contains large harmonics, the distortion can be accurately calculated and the regulator designed accordingly, but it seems unlikely that such a necessity could ever arise for automatic voltage control.

The astatic voltage relay has no contacts needing cleaning or renewal. It does not hunt and needs no anti-hunting devices.

Since both the controlled voltage setting and the sensitivity are determined by gravity and not by spring tensions, they do not vary in service and consequently need no adjustment.

The combination of oil-immersed moving-coil voltage regulator and astatic voltage relay gives an automatic voltage regulator having no open switches, brushes, or sliding contacts, and needing no periodical attention or maintenance (hence the large number of these regulators mounted on poles, in feeder pillars and even in street pits).

So far as inspection and service are concerned, they may be treated exactly as ordinary static transformers. This, in fact, is the maker's official recommendation.

E. T. Norris

FERRANTI LTD.,
HOLLINWOOD

Domestic Appliances and Accessories

British Standard introduces New Design Requirements

IMPORTANT changes are apparent in the revision of B.S.816, which has recently been published by the British Standards Institution. This standard has a special importance because it applies quite generally to all electrical devices (other than electronic devices) which are effectively designed for domestic use, and are not covered by other standards.

The scope of the standard has changed considerably since its former appearance in 1938. It now covers single-phase appliances for use on the narrower voltage range between 30 V a.c. (50 d.c.) and 250 V.

New clauses which are notable include notes on acceptable methods of connecting portable appliances to the supply, and on cord grips. The latter clause calls for a grip which will permit a 10 lb. pull to be applied gradually to the flexible cord of the appliance, without there being any noticeable movement in the grip.

Safety requirements are now segregated into a new section. One clause in this calls for the provision of a guard for any moving parts which may constitute a hazard, except where exposure of those parts is necessary for operation. In such cases it is suggested that arrangements should be made for double-handed operation.

Tests

In the revised standard, the high-voltage and insulation tests to be applied remain as before, but a new check on earthing continuity is introduced. This calls for resistance between the frame of the appliance and its earthing conductor or terminal not to exceed 0·1 ohm when the earth path is tested at the full-load current of the appliance, or 10 ohms if that is greater.

In accordance with general practice to-day, the permissible temperature of handles, casing and insulation is stated in detail with reference to temperature rise above ambient rather than absolute temperature.

Specific Requirements

The list of requirements applying to specific appliances and accessories has lessened in the new standard. Transformers, electrode or water-heaters, electrode steam-raisers and arc lamps are no longer covered. The remaining items are only slightly affected, although 13 amperes is added to the standard ratings of switch sockets. In particular, the requirements for tumbler switches are kept exactly as in the earlier standard, except that the list of single-way single-pole switch ratings is omitted.

Metering Frequency

An electro-mechanical comparison method

OVER the past ten years, considerable effort has been expended in the development of frequency and rate-of-change of frequency meters, as an aid to load dispatchers in anticipating periods of load shedding. A description of one of these instruments, now in use in the Birmingham Control Centre of the B.E.A., has recently been given in the October issue of *Technique*, a monthly journal issued by Muirhead and Co., Ltd.

To appreciate the problem involved in such a system, a simple example of operational method is given. Should an increase in power demand cause the rate of change of frequency to be, say, $-\frac{1}{2}$ c/s per hour, it would take 5 minutes for the frequency to fall by $\frac{1}{24}$ c/s, which is probably the smallest frequency change discernible on a frequency meter. Having observed that this change of frequency has occurred, the controller can only judge from experience how much extra power will be necessary or how much load should be shed, to restore or stabilise the situation. He then has to await the effect of his alteration of system loading to be recorded before he can make another decision.

It will thus be seen that a considerable time is involved if a frequency meter only is provided. If he had a rate of change meter, this time can be much shortened, and also load shedding can be delayed to the last moment.

The System

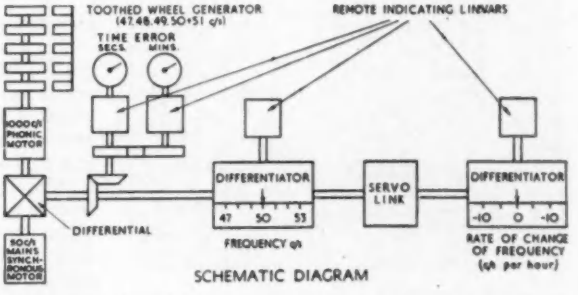
The Muirhead system is designed to indicate mains frequency and time error, as well as rate of change of frequency. Direct indication is given on scales in the mechanism unit, but remote indication is also provided for the control desk. Measurements are made by electro-mechanical comparison of the mains frequency with a reference frequency which can be derived from a valve maintained tuning fork. The reference frequency supplies a phonic motor, the speed of which is compared through a differential with a mains-driven synchronous motor. The output from the differential will be zero, i.e. the output shaft will remain stationary, when the inputs from the phonic and the mains-driven motors are equivalent. Any change of mains frequency will, however, cause a change in the speed of the mains motor and the output shaft of the differential will begin to turn. A geared system of counters coupled to this shaft gives the integrated frequency error (i.e. the time error).

The same shaft also drives a differentiator, the angular rotation of whose output shaft is a measure of the mains frequency error. A second similar differentiator is operated by a servo system controlled by a "Magslip" transmitter, which is driven from the mains frequency error output. The angular rotation of this differentiator is therefore a measure of the rate of change of frequency.

Remote Indication

Remote indicating "Linvars" driven from the output shafts of the differential and the two differentiators provide a.c. voltages proportional to the angle of rotation of these shafts, and thus a.c. milliammeters with suitably calibrated scales can be used for remote indicators.

In use, the instrument has been found by the B.E.A. engineers to be even more useful than was originally anticipated. It has permitted corrective adjustment to the output of generation to be initiated up to several minutes earlier than would otherwise have been possible, and has been a valuable guide to the amount of adjustment required. It can be expected that the problem of matching output with demand will be appreciably simplified when all grid control rooms are equipped with this type of instrument.



Schematic circuit to show system adopted to derive frequency and rate of change of frequency

CRANE CONTROL

Method of obtaining full control of hoisting and lowering, and automatic motor acceleration on cam controllers

TWO new crane control schemes have recently been developed by De Renzi Holmes and Co. Ltd. which are of considerable interest. The first of these, the "Hilotrol" creep speed scheme, enables full control to be exercised by the driver, irrespective of the load. In order to appreciate this system, it is probably desirable to recapitulate the desirable characteristics of a hoist motion. These are: (*a*) a control in the hoisting direction which gives at will a low speed, an intermediate speed and a full speed, with any load from light hook to full load; (*b*) a control in the lowering direction which gives substantially the same control as for the hoisting motion, noting that heavy loads will overrun the motor and require braking, intermediate loads may require either braking or power lowering, and light hook will require power lowering; (*c*) under all conditions of loading sufficient initial torque should be available to bring the load rapidly to the required speed; and (*d*) when lowering, either braking or power lowering should take place as required by the load conditions, and if possible without the conscious discrimination of the driver.

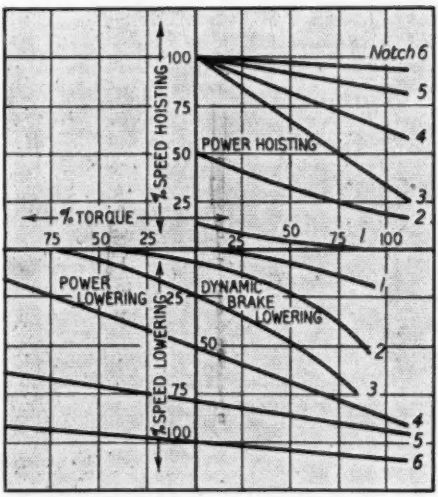


Fig. 1. Speed/torque curves for "Hilotrol" hoist motion to show the operating sequence

The "Hilotrol"

In the Hilotrol system the hoist motion is driven by two ordinary slipring induction motors having a total horsepower approximately 125% of that required to hoist full load at the required speed. Both machines are geared to the hoisting drum and therefore always run at the same speed. One of these motors is always used as an ordinary slipring machine with its speed controlled by rotor resistance; the other, however, is so arranged that it can either act as a brake, by applying d.c. to the stator, or as a motor in the normal manner. An ordinary controller is used, fitted with additional contacts for handling the braking d.c., which is supplied from the a.c. mains via a transformer and a rectifier.

Hoisting and Lowering

The switching sequence can best be understood by reference to the torque/speed curves, which show the characteristics obtained on each notch. At notch 1, the motor unit is connected to give moderate torque in hoisting direction and the brake unit connected for d.c. braking with a low resistance in the rotor circuit. At notch 2, the connections remain the same, but the rotor resistance of the motor unit is decreased, while that of the braking unit is increased. When the controller is at notch 3, both units are connected in parallel to give hoisting torque with resistance in each rotor circuit; the d.c. is, of course, cut off. Notches 4, 5 and 6 reduce the resistance in each rotor circuit until finally the rotors are short-circuited and the motors run at full speed.

When lowering, the sequence is as follows: notch 1 introduces d.c. braking with low rotor resistance, the motor unit being disconnected. Notch 2 increases the rotor resistance of the braking unit and connects the motor unit to give low lowering torque. Notch 3 leaves the braking unit as for notch 2, but increases the torque on the motor unit. Notch 4 gives higher motoring torque and lower braking torque, and notch 5 takes this process still further. Finally, on notch 6 the motor unit only is connected with its slipring short-circuited.

Advantages claimed for this system are that

it gives full control on all loads, provides creep speeds on all loads, has ample torque, limits the a.c. peak loading, reduces resistance losses and is of moderate cost. The d.c. excitation current is small as the motors are not of the same size, the braking unit being comparatively small.

Auto-Cam-Tactor

The second development, known as the Auto-Cam-Tactor, was introduced primarily to give cam-operated contactor controllers the same advantages as are enjoyed by magnetic

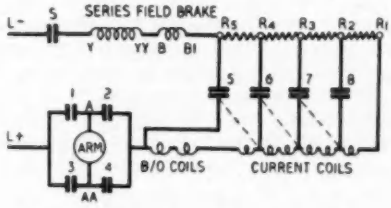


Fig. 2. Key diagram of controller

contactor panels. The system is applicable to a.c. and d.c. motors, and operates by providing a series-wound hold-on coil for each accelerating contactor with which is combined a series-wound sequence coil. A remarkable feature is that no additional moving parts whatever are added to the controller, as the coils are all series wound and require no auxiliary switches. The operating principle ensures that once a pair of contacts is opened, it will be held open, irrespective of the position of the operating cam, until such time as the current in the magnet coil is reduced to a set value, and a holding armature released.

Operation

The action can be understood electrically in Figs. 2 and 3, which represent the Auto-Cam-Tactor applied to a series-wound motor and plain series controller. In this example, contactors 5, 6 and 7 only are controlled because the initial current passed by the starting resistance is not sufficient to warrant controlling contactor 8. If the controller handle is moved slowly from notch to notch, allowing the current peaks to die down to normal between notches, the controller behaves in the ordinary way, each successive contactor closing as the appropriate notch is reached. If, however, the controller handle is moved instantly from the "off" to the "full speed" position in either direction the action is as follows: As the controller reaches the first notch, the contactors 1 and 4 (or 2 and 3) close and current flows from the positive line through the motor armature, b.o. coils, hold-out and sequence coils, starting resistance, brake, series field and contactor 9 or "S" in Fig. 2, to line. This current may be less than full load current, but each Auto-Cam-Tactor has both hold-out and sequence coils energised and so has all the ampere-turns necessary to hold out the contactors against the pressure of the closing springs. Number 8 contactor is not controlled and so it closes as the controller handle passes the second notch. In closing it cuts out a section of resistance which produces a current peak and also cuts out the sequence coil of Auto-Cam-Tactor 7. Owing to the current peak produced by the cutting out of the resistance section R1-2, contactor 7 does not immediately close, and as the handle is moved through the remaining notches the contactors 6 and 5 are held out, even with a small current flowing, both hold-out sequence coils are in circuit.

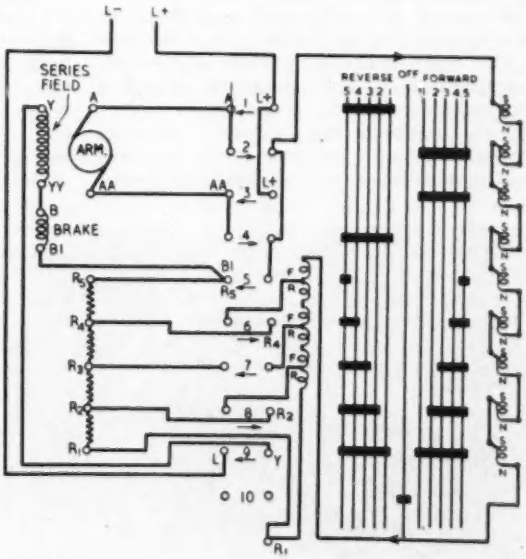


Fig. 3. Diagram of connections of cam-operated controller

When the current peak has died down to the setting value of Auto-Cam-Tactor 7—generally about 10% above full load current—No. 7 contactor closes, and in doing so cuts out the resistance section R2-R3 and the sequence coil of Auto-Cam-Tactor 6. A peak current is again produced, and when this has died down to the setting value No. 6 contactor closes. The same action again takes place until No. 5 contactor closes, putting the armature across the line and bringing the motor up to full speed.

Reversing

If the operator now swings the controller straight through to full speed in the opposite direction, the following action takes place. As the controller is returned to the "off" position the resistance and line contactors are mechanically opened by the cams, and as it passes over to the reverse direction the line contactors and No. 8 contactor close, giving a current peak determined by the value of the resistance section R2-R5 and the value of the back e.m.f. of the motor added to the line voltage, contactors 7, 6 and 5 are controlled as previously described and the motor is first brought to a standstill and then accelerates steadily to full speed in the opposite direction. If the peak current produced on reversal is too high, a further Auto-Cam-Tactor can be used to control contactor No. 8 and so retain the additional section of resistance R1-R2 in circuit until the current falls. This additional Auto-Cam-Tactor would have the usual hold-on coil, but would not require a sequence coil.

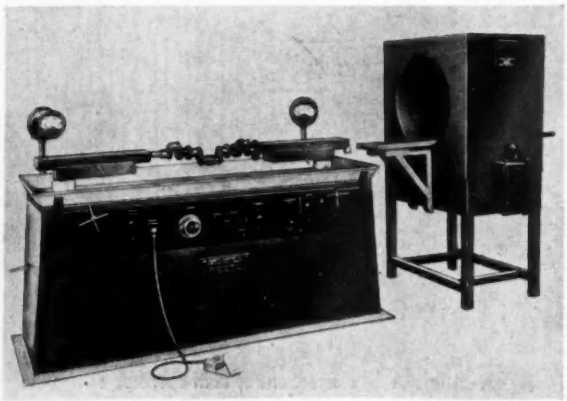
The addition of Auto-Cam-Tactor control in a great many cases renders the hand-operated cam controller the equivalent of the more expensive magnetic contactor equipment, the increase in dimensions required on the controller being limited to about 3 in. on the depth; other dimensions remain unchanged.

VERSATILITY IN MAGNETIC TESTING

DETECTING surface cracks by magnetic methods if often complicated by the need to cover a diversity of components. In an attempt to overcome this difficulty, the Magnetic Equipment Co. have produced a universal testing machine designed to cater for a wide range of castings and shafts up to 5 ft. in length.

Two types of machine are available, one utilising only the current flow method, whereas in the other both this method or external magnetisation can be employed to magnetise the specimen under test before applying detection ink. For the current flow method, the specimen is fixed between two heads, which, mounted on a suitable base, can be adjusted to the required separation. Provision is also made to clamp one head and operate the other by foot control for production work. An advantage claimed for this machine devolves from the absence of running bars for the testing heads, thus reducing possible components likely to be damaged by heavy castings.

Using the external magnetisation method, local magnetisation is provided by coiling the required length of flexible conductor round the part under test. Current supply, obtained from two terminals mounted separately, incorporates a heavy duty change-over switch to safeguard against false readings due to inadvertent short circuiting of heads or cable. As additional accessories, magnetic leeches are provided for testing components which cannot be accommodated in the machine itself.



The magnetic test machine, showing a crankshaft in position for current flow testing. On the right is a 30-in. aperture demagnetising cabinet

From AN ENGINEER'S NOTEBOOK

The first time I came to appreciate the full significance of the double shell construction of turbines was from the British and American papers at the World Power Conference in 1950. By re-routing the i.p. exhaust steam back towards the h.p. end through the space between an inner and outer shell, the drop in steam conditions between the h.p. blading and the outer shell is taken in two stages. It is rather like a mechanical equivalent of the 33 kV triple conductor alternator windings we heard so much about before the war. Now I see that one turbine design has extended to a triple shell. The third shell is confined to the h.p. blading and provides for a drop from an inlet temperature of 1,100° F to 1,000° F between the first two shells and then to 700° F between the two outer shells which cover the whole of the blading to the point of exhausting at 700° F. Such a construction involves a flow through the h.p. blading in an opposite direction from that of the subsequent stages. The outstanding advantage of multiple shell construction is the economy in high temperature steels which are necessary to meet the upward trend in steam conditions. These shells have only to meet the differences in pressure and can accordingly be made of thinner material. The price that has to be paid for this advantage lies in the greater complexity of turbine construction and its consequent effect on maintenance. Such complication, however, is an inevitable concomitant of all advances and the price seems worth while if we want to push up temperatures above the 1,000° F datum.

* * *

Atomic power is bringing with it a host of problems that have little to do with nucleonics, but are straightforward engineering jobs. What must be regarded as one of these relative minor difficulties results from the choice of medium for the heat transfer from pile to boiler proper, and some liquid metal such as sodium has been most frequently discussed. Some of my boiler-house friends have waxed most eloquent about the concept of using liquid sodium as a boiler feed. One thing is certain, the atomic boiler-house will bear little resemblance to the type with which we are familiar, and the sort of revolution that is likely to take place is illustrated by a new type of pump that has been designed specially for this purpose. This is a truly electrical pump for it depends on the electro-magnetic reaction between a low voltage current passing along the liquid metal itself and a magnetic field at right angles to it. The obvious defect of mechanical eddy currents within the liquid appears to have been counteracted by the use of a flattened pipe for conveying the liquid through the pump itself. Even with this feature, the efficiency appears to be abnormally low, in the region of 5%, so it may be that the final answer will be found in some other direction. However, it is quite clear that only by such revolutionary ideas will the revolutionary concept of harnessed atomic power be brought about.

* * *

Such outstanding advances have been made in permanent magnet materials in the last fifteen to twenty years that industry has had no more than adequate time to readjust its designs and manufacturing techniques to the revolutionary character of these precipitation type of alloys. If any further improved material becomes available, I am not sure where it will fit into the picture of permanent magnet usage. Even if we could make our magnets smaller, other factors would often prohibit such smallness and those who know the effect of a trace of magnetic impurity in a moving coil instrument, will not seek more powerful magnets. But experience teaches that for any new material a new use will be found and certainly research workers are right to go on without bothering about practical applications. Thus we find that a U.S. naval ordinance laboratory has recently announed a new bismuth-manganese material with exceptional magnetic properties. The method employed in manufacture appears to be a sintering technique, finishing with hot pressing in a strong magnetic field. The resulting magnets are said to have a coercivity of 3,000 oersteds, which is four to five times that of the Alcomax range. However, much remains unknown of the overall characteristics of this new material. What this new development does show is the remaining possibilities for further progress in permanent magnet materials. E.R.G.

European Economy

United Nations Bulletin reviews Contribution Electricity Can Make

SPECIAL attention is given to the long-range transport of electricity in Europe in a recently published United Nations review.* For the main part, this is based on the Economic Commission for Europe's Electricity Committee studies which were reviewed in the ELECTRICAL TIMES of October 2, but a somewhat different approach is adopted.

The article opens with the comparison that in Norway, where abundant supplies of water were available, electricity could be generated in 1950 at a cost of two dollars/MWh. In Denmark reliance had to be placed on imported coal, with the result that the cost of generation was about 20 dollars/MWh. Yet with such wide differentials existing on the Continent, there has been very little export of electricity between different countries. International trade in electricity accounted in 1950 for only 1½% of the total output in Europe. This may be contrasted with coal, for 12% of Europe's output of this mineral crossed a frontier before being consumed.

Although this may seem surprising at first sight, it has to be remembered that unified networks, even on a national scale, are relatively new developments. Even in the United States sales of electricity across state boundaries are scarcely more important than those in Europe across national frontiers.

The article goes on to discuss the technical considerations dealt with in the earlier documents. In this connection it forecasts that estimates of economic hydro-power potential are likely to rise as time goes on. This is based on the assumption that present estimates pay too little attention to the probable future increases in the price of coal and to the advances to be expected in economical power-plant construction.

As a result of weighing the many factors involved, the U.N. Economic Commission for Europe Secretariat concludes that the application of the theory of comparative costs to the structure of European electricity supply does not, in practice, lead to any large expansion of long-range transport of current. Transport costs of electricity are far from negligible, and are generally higher than the costs of transporting the coal needed for thermal generation.

Abundant Water-Power

There is a strong case for using the abundant water power of southern Norway to supply Denmark and some other countries (including perhaps the United Kingdom), while Yugoslavia might become a major supplier of south-eastern Europe, if hardly utilised water resources were tapped. The high capital cost of hydro-power plants often acts as a deterrent, but in many cases the comparisons involved are based on too optimistic a view concerning the future price and availability of coal. Later on, industrial expansion may well be hampered more by lack of coal and electricity than by lack of manpower.

Less spectacular is the compensation of fluctuations in production and consumption, which is steadily growing. While this does not result in "the magnificent, all-European grid that some have dreamt of," and lacks a central load-distribution authority, it does mean that a large network connecting the principal producers and consumers is growing up. It is suggested that, so long as it is a matter of opinion whether or not the lack of a national control would have a deterimental effect on the efficiency of electricity supply in one country, it is too early to discuss the advantages of an all-European electricity distributor.

PRODUCTION, IMPORTS, EXPORTS AND CONSUMPTION OF ELECTRICITY, 1950

Country	Production		Imports	Exports	Consumption *per capita*
	Hydro	Thermal			
	Millions of MWh				*MWh*
Austria	5·0	1·4	—	0·7	0·8
Belgium ...	0·1	8·4	0·1	—	1·0
Czechoslovakia	1·1	8·2	0·1	—	0·7
Denmark ...	—	2·0	0·2	—	0·5
France	16·2	17·4	0·6	0·4	0·8
W. Germany ...	8·4	36·1	1·6	0·3	0·9
E. Germany ...	0·4	18·6	—	0·4	0·9
Italy	21·6	3·1	0·3	0·1	0·5
Norway... ...	17·7	—	—	—	5·4
Poland	0·5	8·9	—	0·1	0·4
Saar	—	1·5	—	0·1	1·5
Sweden	17·5	0·8	—	0·2	2·6
Switzerland ...	10·3	0·2	0·3	0·9	2·1
United Kingdom	1·9	64·9	—	—	1·3

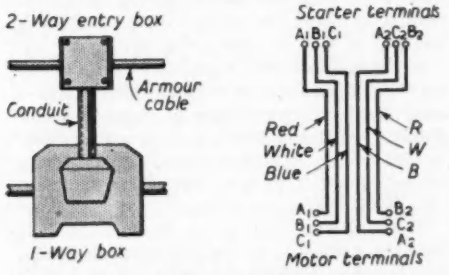
Source; Power Section, Economic Commission for Europe.

* *Economic Bulletin for Europe; Second Quarter*, 1952. *Obtainable from H.M.S.O., price 3s. 9d.*

PROBLEMS AND PRACTICE in Engineering

Terminal Box and Cable Entry

SOME time ago the writer accepted an offer of a second-hand 20 h.p. 3-phase induction motor. The motor was equipped with a one-way terminal box and had to accommodate six leads star delta connected. As I intended installing two lengths of 3-core armoured cable between motor and starter a two-way terminal box would have been more suitable.



Diag. 1 (left), adaptation of one way box for two-way entry and interconnections, diag. 2 (right)

The one-way terminal box, however, was conveniently suited for adapting a two-entry. Additional parts consisted of a three-holed cast-iron box, a short length of conduit screwed at either end, and two bonding clamps. The whole was assembled as indicated in Diagram 1.

As each lead of the two armoured cables was coloured red, white and blue respectively and the motor and starter terminals marked, viz : A1, B1, C1, B2, C2, A2, the appropriate method of connecting up was carried out as illustrated in Diagram 2.—*Novis.*

Cage Rotors

REFERRING to Mr. Woodhouse's contribution (this page, October 30) on squirrel cage rotor faults, any claim of reliability for a particular piece of equipment assumes good workmanship and material in its manufacture. These are proved to have been absent in many cases of rotor faults, faulty brazing being the usual cause. No doubt Mr. Woodhouse assumes the same qualities in his claim for die-cast rotors.

The percentage of rejects during the manufacture of die-cast aluminium alloy rotor windings and brazed copper windings is far higher in the former than in the latter, but this is of no interest to the user. However, slight cracks undetected by the manufacturer which develop into fractures in service, can, in the case of copper windings, be repaired, but when such a fault develops in a cast aluminium winding a complete new rotor is necessary.

These remarks omit any comparison of the electrical properties of aluminium alloys and copper, which is another story, but such comparison would show that the introduction of die-cast aluminium rotors was to reduce manufacturing cost, not to improve on the reliability and efficiency of a well-constructed copper winding.—*R. A.*

Preventing Compound Bleed

WHEN installing paper insulated cables with sealing boxes in the inverted position, it is usually difficult to make an effective seal, and stop bleeding of compound.

As most industrial concerns usually carry only a more or less restricted stock of cable jointing materials, a considerable amount of improvisation has to take place. A method I find very effective is to use two separators with an insertion of soft rubber between, which makes a compound tight joint, which will

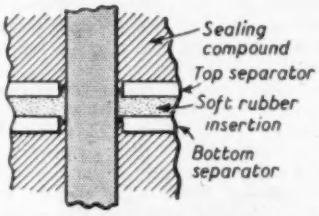


Diagram showing the rubber washers preventing the bleeding of compound

stand up to conditions where an ambient temperature is likely to be above normal.

The holes drilled in the top separator should be large enough to allow the cable to be passed through easily. The holes in the rubber should be slightly less than the size of the conductor, and should be stretched to fit. The smaller the holes in the bottom separator, the better.

From experience I find that the pouring of the hot compound on to the rubber tends to vulcanize it so making a permanent compound tight joint. This type of seal has been used on numerous occasions on medium voltages without giving any trouble whatever, usually in conjunction with the use of oil seals in the conductor.—*P.M.*

Electrolytic Analogues

PRACTICAL APPLICATIONS OF TECHNIQUE AND ACCURACY OF MEASUREMENT DISCUSSED AT I.E.E.

THE use of the electrolytic tank as a medium for plotting electric fields and thus deriving stress distributions, has come into considerable prominence in the past few years. Two articles have already been published in the ELECTRICAL TIMES on this subject, one by M. E. Peplow on "Plotting Voltage Gradients" in our issue of February 15, 1951, and one on the application of this system to the design of h.v. circuit-breakers by E. G. Williams in our issue of January 24, 1952. The ease and apparent simplicity of this method has, however, attracted the interest both of the research worker and the engineer, and last week, two papers, one from the Measurements Section and one from the Supply Section, were presented to a London meeting of the I.E.E.

Accuracy

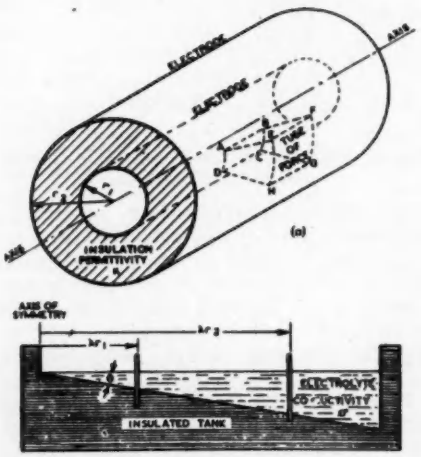
Of these two papers, one, "The Accurate Mapping of Electric Fields in an Electrolytic Tank" by Dr. K. F. Sander and Mr. J. G. Yates, dealt with the instrument itself, while the other, "The Electrolytic Analogue in the Design of High-Voltage Power Transformers" by D. McDonald, was more concerned with the practical application.

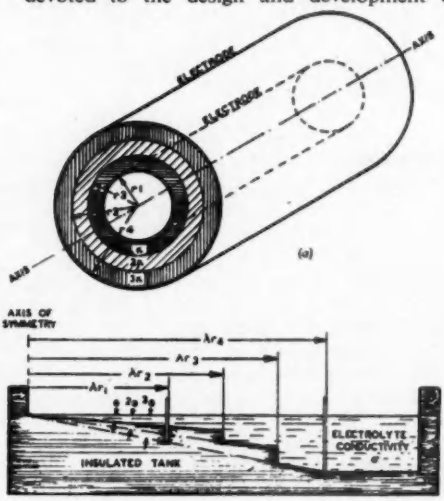
Dealing with Messrs. Sander and Yates' paper first, they pointed out that errors in the system could be divided into two classes. The first of these arose due to the failure of the tank to represent the actual field system it was required to investigate while the second was due to failure to measure the potentials in the tank with sufficient accuracy. It should be pointed out that the authors were considering a degree of accuracy better than 0·1%.

In the first category of errors, were those due to polarisation effects at the electrode surfaces—since the electrolyte did not provide the homogeneous conducting medium as presupposed in the analogy, and in the second were perturbations of the field patterns caused by the insertion of the measuring probes.

When it was required to measure the field strength directly, a pair of probes with suitable spacing was used, it was then necessary to measure the p.d. between the probes, neither of which would in general be at earth potential. To avoid polarisation problems, it was usual to use alternating current, generally with a sine wave characteristic. In the authors' system, a square wave was used, in conjunction with liquid electrodes and a specially designed comparator amplifier.

A considerable amount of the paper was devoted to the design and development of





These two drawings show (left) a three-dimensional field with circular symmetry in a homogeneous dielectric and (right) a similar field with a heterogeneous dielectric

probe arrays and a description of an electrode-electrolyte cell which could be used to determine interface effects and errors. Finally the authors considered the effects of using various types of electrode and electrolyte. They concluded that there was, for best overall performance, an optimum value of conductivity—although it was not critical—representing a compromise between a small value to minimise polarisation errors, and a larger one to reduce probe impedance. For any conductivity there was also an optimium frequency of square wave which should be high enough to reduce polarisation and low enough to prevent errors due to "spikes" produced in the measurement system.

High Voltage Transformers

The application of the electrolytic analogue to the design of high-voltage power transformers was dealt with by Mr. D. McDonald, who began by giving a description of the method of deriving the basic analogue equivalents and the design of an actual electrolyte field-plotting equipment. In this case, the ordinary tap water had been found satisfactory as an electrolyte and the probes had been made of steel, nickel-plated to resist corrosion and lightly silver-plated to reduce the transition resistance. Methods of representing dielectrics of different permittivities by the insertion of conducting pins to assist simulation of abrupt changes were considered in some detail and again attention was paid to sources of error and the means adopted to minimise their effects. In the equipment considered, the representation of homogeneous dielectrics lay within an accuracy of 0·3% and that of heterogeneous dielectrics to within 1%.

The second section of the paper showed the method of applying the analogue to the problem of analysing the stresses in high voltage transformers.

DISCUSSION

Dr. E. Colin Cherry, in opening the discussion, suggested that the Laplace equation was really the root of the analogy, and if that were accepted it would be seen that the analogy was very general and could be widened so as to make it possible to represent not only physical fields but abstract ones. When, after the war, his own laboratory became interested in the use of the electrolytic tank for abstract fields, it seemed to be generally assumed that it was no use for accurate work. That was a challenge, and the result of meeting it was shown in Mr. McDonald's paper. The use of liquid probes by Sander and Yates was a novel idea and an interesting breakaway from convention.

Dr. R. Bradshaw (Manchester College of Technology) pointed out that although all Mr. McDonald's stress diagrams were given in the form of equipotential plots, the ultimate object of these plots was to recognise and estimate the regions of high stress. It might be of interest to consider some other form of representation, such as a stress map. They were making experiments in Manchester with a semi-automatic plotter, which would give very quickly a trace of dots on the paper merely by pushing the probe across the tank, thus enabling a region to be explored very quickly while avoiding the complication of the fully automatic plotter.

Mr. E. R. Hartill (Metrovick) said that they had been using an electrolytic tank for transformer and other design purposes, and, although Mr. McDonald's paper was confined to transformer problems, he would like to emphasise its value for h.v. switchgear, magnetic circuits, slot reluctances and also the flow of steam through turbine blades. With the tank arrangement which they used, they had no difficulty in getting accuracies of the order of 1 or 2 %, which were adequate for most engineering purposes. Their plotting table, which was transparent, was arranged vertically above the tank, and made it possible to compare plots very easily after a slight change had been made in the model; the underside of the table could be floodlit, and the two plots showed up in sharp contrast.

They preferred to make their models in wood rather than wax. With both methods there would be errors in making the wooden blocks, but with wax there would be an additional error, because when the block was taken out it might be necessary to repair the surface of the wax. The method would be most valuable in engineering education, and a wooden model would be better for this purpose, being more permanent.

Mr. P. A. Einstein (A.E.I. Laboratories), referring to the use of pins at the dielectric boundary, said that they should not be too widely spaced or they would be ineffective, nor too closely placed together, so as to approximate to a continuous metal boundary and thus disturb the conductivity in a horizontal direction. On the basis of a 0·5% voltage drop at the pin boundary, the optimum ratio of pin diameter to pin spacing would be about 1 to 4.

Mr. M. E. Peplow (Reyrolles) said that the position of the supply leads and the other phases of circuit-breakers could have a great effect on the circuit-breaker voltage division. This had been shown up by models and had saved a great deal of expensive full-scale testing.

He hoped that prospective users of the tank would not hold back because of the growing elaboration necessary for certain purposes. For

some problems with silver-plated electrodes, the surface impedance effects could be ignored, so that even 50 c/s and a high impedance voltmeter gave results which could be used.

MR. F. J. MIRANDA (A.E.I.) referred to a simple form of analogue which he had used for the past two years, which used teledeltos paper, a conducting paper with a resistivity of about 2,000 ohms per unit square. The boundaries were drawn on it with a highly-conducting paint or metal sprayed through stencils, and layers of colloidal graphite applied to the areas representing discontinuities in the dielectric. Since there were no polarisation effects d.c. could be used, the Wagner earth was eliminated and single or multiple probes used with no complications due to stray capacitance or meniscus. The same technique could be used in the study of two-dimensional fields, and the results were comparable in accuracy with those with the electrolytic tank.

MR. E. G. WRIGHT (Ferranti) said that the electrolytic tank would solve problems impossible of solution by mathematical means. On the other hand, it gave only a particular solution to the problem, and, therefore, it was sometimes advantageous to use it to assess the range and validity of orthodox mathematical methods.

The direct measurement of field strength was attractive, and the techniques described by Sander and Yates seemed to make this possible with good accuracy for certain applications. However, only the average field strength between probes placed at least 0·5 cm apart was measured, and the maximum field strength might be 10-20% greater; moreover, the major error for multi-dielectric fields appeared to be due to the model effects rather than to polarisation or measuring technique. It did not appear, therefore, that the techniques suggested to achieve this accuracy were really necessary in practical design problems.

MR. G. J. EDWARDS (B.T.H.) described some recent detailed improvements which, with Mr. McDonald's assistance, had been made in the design of electrolytic tanks. He added that for the detector there seemed little to choose between earphones and the cathode-ray oscilloscope so far as accuracy was concerned, but the latter was found to be less tiring to use.

MR. H. DIGGLE (Metrovick) expressed the opinion that in most practical electrostatic problems in transformers, they were not interested in very great accuracy, but primarily in flux plotting and in seeing how the equipotential lines grouped close together in some cases and were more spread in others. It was the making of the model which took most of the time; the actual plot could usually be done in less than quarter of an hour, so that no practical advantage would be gained from an automatic plotting device. Unlike Mr. Edwards, they preferred earphones as being less tiring than the cathode-ray oscilloscope.

MESSRS. F. C. WALMSLEY, J. H. WESTCOTT and A. BLOCK also spoke. MR. D. MCDONALD and DR. K. F. SANDER replied.

Motor Protection by Thermal Relay

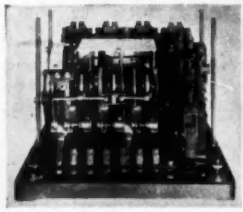
STEMMING from the need to provide satisfactory protection for induction motors capable of handling heavy and prolonged starting currents, Chamberlain and Hookham Ltd., have developed a protective relay dependent for its operation on the heating effect of the motor current. The relay, of which three types are available, has been designed to guard against unbalanced conditions, and prolonged overloading.

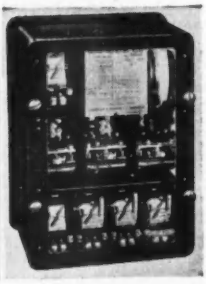
Current measurement is performed by a heating element in each line, the heat energy liberated controlling the movement of a spiral bi-metal strip. For unbalance protection, any one strip, moving in relation to either of the other two, closes a relay circuit which operates the main circuit-breaker. By this method, the motor is protected against unbalance greater than 12% in any phase.

One of these spirals also provides overload protection. Compensated for ambient temperature variations, this spiral is connected to a pointer on which one contact of the tripping circuit is fitted. The other contact is mounted on a load percentage scale traversed by the pointer, and can be varied to provide protection from 50% to 150% of normal full load.

Of the three types manufactured, two are basic models, differing only in characteristics. One measures current directly, being designed for motors taking starting currents less than seven times full load. The other, for higher multiples of starting current, has its heating elements supplied by saturable transformers to provide the necessary delayed action. Adding three instantaneously operating relays to this latter model provides the third type available and as a further refinement, tripping indicators can be included in all models.

On the right is the complete unit, all indicators showing faults. Below are seen the unbalance relay contacts and bi-metal spirals





. . . FREEDOM TO SELL

Speakers at E.P.E.A. Divisional dinner criticise official restrictions

SPEAKING at the dinner given by the South Eastern Division of the E.P.E.A. on Friday last, the Rt. Hon. Geoffrey Lloyd, Minister of Fuel and Power, said that his actions in regard to the nationalised industries were based on the principle that they were here for the service of the nation. They must not become the playthings of party politics.

Mr. Lloyd was proposing the toast of "The Association," and he emphasised that the Ministry appreciated the importance and value of the E.P.E.A. It was realised that the Association was a professional body which would give every Government professional service. There was a great job to be done by the electricity industry, and he hoped the Association would continue to do its good work in this connection.

The Minister in the course of his speech remarked that he had re-appointed Lord Citrine as Chairman of the B.E.A. because he was doing a grand job.

In reply, Mr. J. L. Moss, President of the E.P.E.A., assured the Minister that the Association appreciated its responsibility to the public. They would always see that electricity supply was placed above other interests. They had welcomed the re-appointment of Lord Citrine, and looked forward to the future prosperity of the industry under his guidance.

Engineering Responsibility

The Association claimed that the technical engineer was the spine of the electricity supply industry. This position engendered pride, but also brought responsibilities. It was the thought of this, and of the future ahead of new junior engineers, that inspired the executive to displays of obstinacy when negotiations involving differentials were under way.

In the Queen's speech at the opening of Parliament it had been indicated that the Government was considering revising the administration of electricity supply in Scotland. He emphasised that Scots members of the association would view with displeasure any semblance of severance from England. Finally, Mr. Moss called on members to be willing to take decisions and accept responsibility. This was the one way to maintain the traditional position of the engineer. To do this, it was necessary to have an understanding of men as well as materials.

Time to Sell

In a speech which introduced the toast of "The Electricity Supply Industry," Sir John Dalton (Director, C.M.A.) suggested that the industry had oversold the public on the idea of plant shortage. As the public insisted on having warmth, light, and cooking, they were rushing to other fuels. The general embargo on promotional advertising had not stopped the Gas Council from staging a show at the Festival Hall and receiving T.V. publicity. The electricity industry had played the game at a difficult time, and now it should be allowed to go over to selling electricity.

In his reply on behalf of the industry, Mr. H. J. Randall (Chairman, L.E.B.) echoed many of these sentiments. He suggested that the industry was facing two main criticisms. From inside the industry there was bewilderment arising from the restrictions on selling. Many engineers had been nurtured in the belief that electricity was by far the best fuel for most industrial and domestic tasks. They had a feeling that development in the industry was being unnecessarily curtailed. It was only right that the Minister should know that this feeling existed.

From outside the industry there came criticisms that enough regard was not paid to public requirements, and suggestions that there was more concern with empire building. Such allegations must be convincingly answered, or else matters put aright.

In conclusion, he recalled that the Minister had won the goodwill and admiration of the industry by his public defence of the L.E.B. for their offer of free energy for floodlighting.

The speechmaking at this pleasant function —the 25th of the series—was rounded off by a presentation to the retiring General Secretary of the Association, Mr. J. F. Wallace. This took the form of a cheque, which was handed to Mr. Wallace by Mr. Moss. Mr. Wallace replied to the toast of his health, which was accorded musical honours, with a modest speech expressing his enjoyment of his years of service with the E.P.E.A.

Selling Electrical Plant to the World

IT is possibly a truism that no seller in the world's market can succeed unless the potential buyer is aware of the equipment that is available for purchase. At the same time it is true that, apart from reputation and tradition, advice from consulting engineers, and information in local and general technical publications, the overseas purchaser has little idea of the firms which can supply him with his requirements. In these circumstances, the second edition of the B.E.A.M.A. catalogue can provide a most useful and effective service.

Although this catalogue has a private distribution, it should yet be a most powerful weapon in the capturing of overseas markets, holding, as it does, the reputation of an "authoritative buyer's guide to the range of products of Britain's electrical industry."

A notable innovation in this second edition —the first was published in 1949-50—is a glossary in five languages: English, French, German, Portuguese and Spanish—giving the technical terms current in the electrical industry, which should permit the buyer to identify those firms which can best supply his immediate requirements.

A comparison of these two editions, however, is of considerable interest. One of the first things to strike the mind of the impartial observer is the fact that the alphabetical sequence is much better in the later issue. The second is that the classification is much more to the point. In this connection, it should be remembered that the sections into which the volume is divided consist of: Power Plant, Industry, Transport and Communications, Domestic and Commercial, Glossaries and Indices, Buyer's Guide, Trade Directory and Catalogue Index. It can readily be seen that many items made by the heavy industry section of the industry can fall between the first and second headings, and again there can exist a considerable overlap between the second and third classifications. Thus many firms appear two or three times within the volume, while others, whose turnover may be considerably greater, although restricted to a smaller field, appear only once.

Such criticism is, however, of minor importance when compared to the book as a whole. The classified buyer's guide gives a lead to some 1,200 products and over 15,000 copies of this new edition have been issued to buyers, distributors, public utilities and trade commissioners overseas. In this way it is hoped that full information on the British electrical industry's products will be readily available throughout the world.

The catalogue is published for the British Electrical and Allied Manufacturers' Association Inc. by Iliffe and Sons, Ltd., its size is 12 in. by 8½ in., and it runs to 1,020 pages.

Launching the Catalogue

Speaking at a luncheon held to launch this second catalogue, Sir Harry Railing, proposing the toast of "Exports and the Electrical Industry," made special appeal to the Government not to kill the home trade by excessive purchase tax and by other heavy taxes. The industry could not afford to have 70% of its life blood drained away by taxation.

In the export field the electrical industry had shipped goods last year to the value of £190 million. For the present year the estimated figure was £210 million. Next to the textile and vehicle industries, the electrical industry made the largest contribution to the country's exports.

The task undertaken by B.E.A.M.A. from its inception was to create an electrical industry which could stand foursquare to any other in the world in regard to capital, quality, competition and service, and which would lead the world in research and development. Among the co-operative activities of B.E.A.M.A. was the production of the Export Catalogue, which now had a circulation of 16,000. A new bulletin, the Electrical Export Bulletin, was also being launched for the first time.

The reply was made by Mr. H. R. Makeson, M.P., Secretary for Overseas Trade, who, after commenting on the great aid the B.E.A.M.A. catalogue gave to the export drive, referred to the general question of exports. It was essential to maintain international confidence in sterling, and this could only be done by expanding overseas earnings. On the question of credit, he said we could not afford to sell goods generally on long-term credit, but if the Board of Trade was approached in cases where this seemed justified they would see what could be done. They were not rigid in their approach to this practical problem and knew its importance in the capital goods field.

He appreciated the difficulty of increasing exports in a world where restrictive tariffs and quotas were on the increase. The Commonwealth Conference will have much to say on this difficult subject. In his view, however, there was a potential market in South America, where capital investment was taking place on a large scale.

Signalling in Comfort

NEW DESK AT EALING (L.T.E.) EASES SIGNALMAN'S TASK

A NEW signalling installation, devised by Mr. R. Dell, Signal Engineer of London Transport and manufactured by the Westinghouse Brake and Signal Co., has just gone into operation at Ealing Broadway. As many of our readers will know, this station represents the termination of branches of the Central London Underground and of the District Line. The new system covers both these lines. It has been arranged on the "route" system with push-button operation. Each button when pressed operates the points and signals for a particular route, and once the train has covered the route, the button returns to normal. Thus the complete operation of signalling a train through a route is achieved by the signalman pressing the button once.

A system of pre-selection permits the signalman to press the button for another train movement after he has cleared the signals for a previous movement. Immediately the first train has passed through its route, the points will be operated for the second route and the signals cleared without any further effort on the part of the operator.

The push-buttons are made of transparent "Perspex" and, by means of coloured lights below them, act as indicators. When the route is at danger, the buttons glow red, when a button is pressed to select a route it glows yellow, and when the route is set and signals cleared it turns to green. After the train has passed it reverts automatically to red.

A signal which has been cleared by the pressing of a button may be replaced to danger by pulling the same button: similarly a button which has been pressed and has changed to yellow having pre-set a route may be returned to danger by pulling.

As can be seen from the photograph, the design of desk is such that the signalman can reach all buttons while seated. A telephone control-panel with microphone and loud speaker is on his left, while a control board for station train indicators is on his right. The state of the terminus at any moment is shown by an illuminated diagram.

The operation is divided into two sections. First is the push-button desk and pre-selection system using telephone techniques and second is the main operating system using levers and standard signalling techniques. Conversion from the first to the second is by means of pneumatically controlled piston mechanisms which operate the miniature lever frame, which is fitted with full mechanical interlocking. In an emergency the system can revert to hand operation from the frame room. Provision has also been made for the automatic signalling of Central Line trains in and out of the station should this be needed.

The installation includes the provision of two-aspect colour light signals with junction indicators for diverging movements, train-stops at all signals used by passenger trains, condenser feed track circuits, and electro-pneumatically operated point equipment. Approximately 200 miles of wire with 25,000 terminations have been used in the construction of the installation.

It is possibly of interest to note that the track circuiting of the L.T.E. system is carried out at 33⅓ c/s, the power being supplied from rotary converters. This is to avoid any mal-operation of signals if leakages of 50 c/s industrial power should occur and find a path along any of the running rails.

The whole of the work has been carried out by the staff of London Transport under the control of the Chief Engineer, Mr. P. Croom-Johnson, C.B.E.

overseas news

B.C. Project

Planned to be in operation early in 1954, the $30 million Waneta power plant of the Consolidated Mining and Smelting Co. in British Columbia is progressing well. Construction began in June last year on this project being built on the Pend-d'Oreille river, a short distance from its junction with the Columbia river. Work is so well advanced that portions of the concrete dam and headwork have been poured. The overall height of the dam is to be 250 ft, with a spillway drop of 200 ft. One of the unusual features of the Waneta power plant is the large power generating units which have been ordered. These are stated to be the most powerful Francis-type units ever constructed in Canada, and second only to those installed at Grand Coulee for North American power operations. There is provision for four of the turbines at the Waneta power plant, but only two will be installed initially, giving a total output of 210,000 h.p.

Ontario Rates Up

The rate the Ontario Hydro-Electric System charges municipalities for power will be increased by an average of 14·8% in Southern Ontario with effect from January next, Mr. R. H. Saunders, chairman of the Commission, has announced. Mr. Saunders attributed the rise in rates to the increasing use of steam generation to meet the power needs of the province. In 1953, it is anticipated, steam-generated power will be necessary to carry not only the peak loads but the base load as well, he said. And steam generation, which represented 1% of the cost of power in 1951, will represent 24% in 1953.

More Plant for Jamaica

The Jamaica Public Service Co. has placed an order with the Brush Electrical Engineering Co. for a second 12,500 kW Brush Ljungstrom turbo-alternator set for installation at the Hunts Bay steam power station, now under construction at Kingston. Consultants for the project are Ewbank and Partners.

Norway's Railways

The Norwegian State Railways' plans for changing Norway's main lines to electric working will take eleven years and cost about 202 million kroner, according to the railways' Director-General. At the present 23% of the country's railways are electrically operated. When the plans are completed the State Railways will save 24.5 million kroner on their present annual coal bill, it is estimated.

Salisbury's Plan

Work on the first stage of the No. 3 station at Salisbury, Southern Rhodesia, is to be put in hand at the end of next year. This station is to be of the semi-outdoor type. Returning to Salisbury after a visit to Britain, Mr. J. E. Mitchell, the city electrical engineer, has stated that adoption of the semi-outdoor style will probably save some £120,000. The cost of the first stage, which is expected to be completed by 1956-57, is estimated at £2,700,000. Much of the plant has been ordered. The whole project will cost about £8,000,000.

Outlook For New Industries

The Planning Commission of India has under consideration the development of 40 industries in South India. Among the industries which are considered suitable for development in the States of Madras, Mysore, Travancore-Cochin and also Hyderabad are aluminium, dry cells, electric lamps, electrical machinery and equipment, heavy chemicals, iron and steel, micanite, power-driven pumps, storage batteries, and telephones.

Orders Coming ?

A large order for equipment for the new thermal power station at Hyderabad is likely to be placed abroad very soon, according to reports. These sources suggest that the order for turbines is likely to go to Switzerland, while British manufacturers may get orders for the boilers and the switchgear.

Double Taxation

Before the Bombay Sales Tax came into force last month, the Association of Electrical Undertakings endeavoured to get inserted a new sub rule to exempt from the taxable turnover material used by electricity supply undertakings for generation, transmission and distribution of electrical energy. This was not a new concession, for under the old Sales Tax such materials were exempt. But the Association's application has been turned down by the Government. The former's argument that sales tax on materials used by electric supply undertakings would in the context of the duty already levied by the Government on electrical energy result in double taxation of the industry did not appeal to the Government, the explanation offered being that there were other articles which attracted similar imposts.

Expenditure at Singapore

Approval for the expenditure of more than $S23 million next year on Singapore's new power station at Pasir Panjang, has been given by a City Council Committee. Of that total $S17 million has been earmarked for plant and machinery and $S6 million for civil engineering works. Another job also to be financed by loan funds, is the construction of a new showroom and office for the Electricity Department. It is estimated the land and buildings will cost $S1,750,000. This item has been approved.

W.A. Inquiry ?

The price paid by the State Electricity Commission of Western Australia for the country power stations it had taken over from local governing authorities had not been revealed, it was stated in the Legislative Assembly last month. The member, Mr. Nulsen, was moving for a Royal Commission to inquire into the "high charges for electricity and gas, and into the administration of the State Electricity Commission." He said that the Collie power station had cost more than £340,000 and between 15 and 20 other electricity supply stations had been taken over in the country. The prices paid for these stations had not been revealed, but they had shown a loss of £51,672 in 1951, he said.

New Cable Factory

The new factory of British-Australian Power Cables (Pty.) Ltd. at Port Kembla, New South Wales, was officially opened last week by Mr. Cahill, the N.S.W. Premier. At the factory, lead sheathed power cables are to be made. The new concern has been formed by an Australian firm, Metal Manufacturers Ltd., and British Insulated Callenders' Cables Ltd. it is stated.

Tarraleah Development

A new tunnel, costing £500,000, is to be built to carry water from Lake King William to Tarraleah power station, Tasmania. Announcing this recently, Mr. Cosgrove, the State Premier, said there was only one channel feeding the generators at Tarraleah at present, and another was necessary to augment the supply for the new turbine to be installed. Another reason was that the station would be cut off completely if a landslide blocked the only canal leading to the powerhouse, as happened several years ago. The Premier also announced that it was hoped electricity rationing to bulk consumers would end by July next year. Probably domestic restrictions would also be dropped, for the Tungatinah power station should be operating next July, and by October, 1954, it would have three 35,000 h.p. turbines running.

Lack of Money

Rising costs are causing the Dalby Town Council, Queensland, to prune work of its electricity undertaking. The council require loan authorisations of £212,985 in the current financial year to meet its commitments. This shortage in funds largely has been brought about by the steep increases in cost of materials and labour since estimates were prepared. The council is to ask the State Electricity Commission to make a thorough investigation into the electricity development scheme approved for the Dalby electric authority area to find out which part of the programme would be economic, and what section should be deferred or abandoned.

North Island Hopeful--

The second generating unit at Maraetai power station of the New Zealand State Hydro-Electric Department was put on partial load last month, following the completion of tests. As a result, the North Island's power problems should not be as acute this summer as last, and the prospects for next winter are brighter than they have been for many years. The main task still to be completed at Maraetai is the placing of the concrete block in the diversion tunnel. When this is completed toward the end of January, the lake can be filled to capacity and three units run at their maximum power of 108,000 kW, possibly by the end of February. Two more generators are to be installed after that date, making it probable that Maraetai will reach its full 180,000 kW in 1954.

--But Not South Island

But over on South Island, the outlook does not look too hopeful at the moment, according to Mr. W. H. Gregory, district engineer of the State Hydro Electric Department. Speaking at Christchurch last month, he said the storage of water for power generation in the South Island was causing concern—there was a reduction of over 34 million units compared with the same period last year, which was abnormally wet between October and January. They were still awaiting a run-off from melting snows and north-west winds, and it looks as if they would have difficulty in filling Lake Coleridge and the other lakes before February unless there was abnormal rainfall.

In Search of Money

President of the Electric Power Development Co., Japan, Mr. Tatsunosuke Takasaki, has flown from Tokyo to Washington to confer with officials of the World Bank on the question of a loan to provide for development of Japanese power resources. Following a conference, the Japanese power companies have been authorised by the Government to offer their facilities as security for foreign investments. The Ministry of International Trade and Industry has already prepared data on estimated requirements and possible development, selecting seven schemes as worthy of priority treatment. According to this draft, Japan's generating capacity will increase by 299,400 kW this year, by 1,480,200 kW next year, 868,500 kW in 1954, 264,600 kW in 1955, and by a further 673,200 kW in 1956.

PERSONALITIES

IN THE INDUSTRY

Mr. A. G. Owen has been appointed to the board of the Sun Electrical Co., Ltd. He was formerly a special director responsible for the installation accessories side of the company's business.

Mr. A. G. Owen

Mr. V. A. H. Clements, M.I.E.E., F.R.ECON.S., assistant commercial manager, British Electricity Authority, has been nominated as British representative of the U.N.I.P.E.D.E. Study Committee on the Electrical Development of Little Developed Countries with particular reference to Tropical Countries. Mr. Clements was responsible for the report on electricity supply in Jamaica, which made the now adopted recommendation for the ultimate standardisation of frequency at 50 c/s.

District commercial manager at Swansea for the South Wales Electricity Board since April, 1949, **Mr. G. J. Higgs,** A.M.I.E.E., has been appointed senior assistant, Low Voltage Section of the Commercial Department at the Board's West Central Sub-area. Prior to nationalisation he was with the Cardiff Corporation Electricity Department.

Mr. J. Parry, general manager of Crypto, Ltd., has been appointed to the board of directors.

Mr. W. Brown, A.M.I.E.E., previously first assistant district engineer in the No. 4A (Preston) district of the North Western Electricity Board, has now been promoted to district engineer there. Before nationalisation, he was deputy borough electrical engineer at Morecambe and Heysham. Educated at the Royal Lancaster Grammar School and the Storey Institute Technical College, he joined the Morecambe Electricity Department in 1921. He became mains superintendent five years later, holding that position until being appointed deputy borough electrical engineer in 1946.

The B.B.C. announces that **Mr. R. J. Gilbert,** engineer-in-charge of the Ottringham transmitting station, has retired under the age limit. Mr. Gilbert joined the staff of the B.B.C. at Savoy Hill as an assistant maintenance engineer in 1924. After serving at Plymouth and at the transmitting stations at Washford, Droitwich and Lisnagarvey, he became assistant engineer-in-charge at the Start Point transmitting station in 1939. He became engineer-in-charge at Stagshaw in 1942 and engineer-in-charge at Ottringham in 1945, which post he held until his retirement.

Previously shift charge engineer at Fulham power station, in the London Division, B.E.A., **Mr. C. E. Sheppard** has been appointed deputy station superintendent at Bow generating station.

Retiring after fifty years' service with Falk, Stadelmann and Co., Ltd., **Miss M. B. de Peare,** manageress of the Secretarial and Typing Department, has been presented with a radio set and a cheque by the directors.

At present chief generation engineer (operations) of the Merseyside and North Wales Division of the B.E.A., **Mr. R. L. Batley,** A.M.I.Mech.E., has been appointed Controller of the Midlands Division in succession to **Mr. F. W. Lawton,** M.I.E.E., M.I.Mech.E., A.C.T.C., who is to retire at the end of this year. Mr. Batley started as a marine engineer after a mechanical engineering apprenticeship at the Cunard Engine Works and following studies at Liverpool University, Bradford Technical College and the Regent Street Polytechnic. Subsequently he held power station appointments at Bradford, Hackney and Neasden (where he became resident engineer). In 1944 he went to Swansea as generation engineer, having charge of the management of the Tir John station, and in 1947 became superintendent engineer of generation of the Liverpool Corporation Electric Supply Dept. He took up his present post on the establishment of the B.E.A. in 1948. Mr. Lawton is well known throughout the industry as being responsible for the construction of Hams Hall "A" and "B," Nechells "B" and the new Drakelow "A" power stations. He has been controller of the Midlands Division since the B.E.A. was set up. Earlier he had been prominently associated with the City of Birmingham undertaking, after serving as assistant to the city electrical engineer of Stoke-on-Trent. At Birmingham he was initially engaged on power station design, operating and testing, and subsequently he became special technical assistant, chief assistant engineer, and in 1940, deputy chief engineer and manager. He was promoted to the position of chief engineer and manager in 1944.

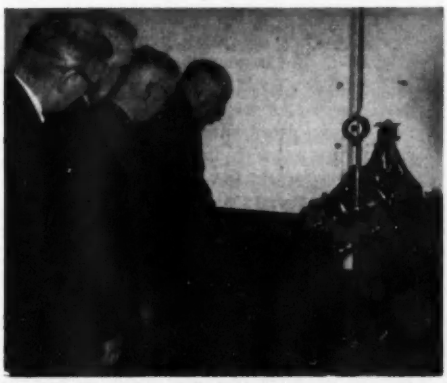
Mr. R. L. Batley

Mr. F. W. Lawton

Station superintendent at Castle Meads generating station, Gloucester, **Mr. D. MacLeod,** A.M.I.E.E., has been appointed to a similar post at the South Western Division's East Yelland power station, where he takes up his duties early in the New Year. It was only in October that Mr. MacLeod took over his present position at Castle Meads from Mr. H. G. Blowen. Earlier he had been power station superintendent at Exeter, going there last year after serving at Croydon 'A' power station since 1932. During the last eight months at Croydon 'A' he was acting station superintendent after 15 years as deputy station superintendent. Mr. MacLeod gained technical education at Keighley Technical School and the Bradford Technical School, and obtained early training with the Keighley Corporation Electricity Dept. and Vickers, Ltd. From 1923 to 1932 he was shift charge engineer at Halifax.

Mr. D. MacLeod

Marking his fiftieth year with Electric Construction Co., Ltd., **Mr. W. M. Furniss,** chairman and managing director, was the recipient of a presentation made last week by the workpeople and staff at Bushbury. At his own request the presentation took the form of an illuminated double-dial clock mounted above the main-office entrance in Showell Road. On the wall below the clock is mounted a plaque, recording the event. The presentation was made by three employees, each with over 50 years' service. Mr. W. M. Furniss joined the company as sales engineer in 1902. He became general manager in 1915, director and manager in 1926, managing director in 1942, combining the latter office with that of chairman of the board of the company in 1948.



Mr. Furniss starting the clock by releasing the pendulum weight

Johnson and Phillips Ltd. announce the appointment of **Mr. F. Moores,** B.SC.(ENG.), A.M.I.E.E., as manager of the company's Capacitor Department. Mr. Moores, whose appointment took effect on December 1, was formerly with British Insulated Callendar's Cables Ltd. at Helsby, where he had been concerned for over twenty-five years with every aspect of the capacitor business. During the war years he worked in conjunction with various service departments and was responsible for the development of delay networks and special capacitors for radar. He is also well known for the valuable service he has given on the appropriate B.E.A.M.A., B.S.I. and E.R.A. committees for capacitors.

Mr. F. Moores

With the Transmission Department of the London Division of the B.E.A. for the past two and a half years, **Mr. R. J. D. Cakebread,** A.M.I.E.E., has taken up duties this week as second assistant engineer, in the Transmission Design Department at the B.E.A. headquarters. Earlier, he was with Kennedy and Donkin.

Mr. Harry Norton is to be the new general secretary of the Electrical Power Engineers' Association. The appointment was made by the National Executive Council at its meeting last week-end. Mr. Norton, who has been deputy general secretary, will succeed **Mr. J. F. Wallace,** who retires at the end of the year; his name was the only one put forward by the Divisions throughout the country. As a result of this promotion, two other appointments have been made. **Mr. H. O. Mayfield,** previously senior assistant secretary, now becomes deputy general secretary in Mr. Norton's place, and **Mr. A. M. F. Palmer,** A.M.I.E.E., M.P., is to be editor of the *Electrical Power Engineer* and responsible for the research, publicity and educational work of the association. Mr. Norton was educated at King Edward VII's School, Sheffield, and was for some years in the Transport Department of the Sheffield City

Mr. H. Norton

Mr. J. F. Wallace

Council, during which time he gained much experience in trade union affairs with the N.A.L.G.O. He joined the staff of the E.P.E.A. in 1944 as an assistant secretary in Scotland and the North. Promoted national negotiations secretary in 1947 he became deputy general secretary a year later. Mr. Norton has played a major part in building up the new comprehensive structure of salaries and conditions for the technical staff in the electricity supply industry. Mr. H. O. Mayfield gained early experience on the electrical manufacturing side before joining the former Metropolitan Electric Supply Co. in 1930 in their London Substations Dept. He was selected as assistant secretary for the London area of the E.P.E.A. in 1948 and promoted to senior assistant secretary two years later. Mr. Palmer's prominent association with the E.P.E.A. since 1945 is well known. Earlier he had been on the head office staff of the London Power Co., and before that with the Metropolitan Electric Supply Co.

OBITUARY

Mr. R. Robinson, general manager of the Tyne and Wear Electrical Co. Ltd., died recently. He was 59 years of age.

Mr. G. W. Steward, A.M.I.E.E., who retired from the position of electrical engineer and manager to Lowestoft Corporation four years ago, died on November 27, aged 68.

Mr. R. Finch, who died on November 24, was president of the International Conference of Non-Ferrous Metal Manufacturers from 1946 until last June, and prior to his retirement in 1946 a joint managing director of I.C.I. Metals Division. He had also been a director of Steatite and Porcelain Products Ltd., and for a time acting chairman of that company.

Mr. Frank Gurney, M.I.E.E., who recently became home sales manager to the Metropolitan-Vickers Electrical Co. Ltd., died on November 27. Educated at Keighley Grammar School and gaining engineering training with the Yorkshire Electric Power Co., he joined Metrovick in 1919. After a period in Motor Sales Dept. he went to the Manchester district office. After being district manager at Stoke-on-Trent and Leeds, he returned to Trafford Park in 1941 as sales manager of the Transformer Dept. Four years later he became sales manager of the Plant Dept., and in 1949 was appointed assistant manager, Home Sales. Mr. Gurney was chairman of the North Midland Centre of the I.E.E. in 1941-42.

Mr. F. Gurney

Mr. W. H. Good, of the Haslingden electrical contracting concern of that name, died recently, aged 56.

Mr. D. Berry, who died on November 26, aged 77, was formerly mains superintendent with Glasgow Corporation Electricity Department, and retired in 1940, after completing 40 years' service.

TRINIDAD'S RECORD OF PROGRESS

IN an area in which a large number of small private generating sets are in operation, the increase of 16·9% in total units sold during 1951 recorded by the Trinidad and Tobago Electricity Commission is noteworthy. The largest consumption—10·6 million units—was for industrial power, being 31·8% higher than for the previous year. Domestic light and power consumers, however, took 5·9 million units—an increase of 16%, while for general lighting nearly 2 million units were sold to 10,516 consumers. Altogether the Commission sold 48·3 million units during the year, including 26·8 million to the Port-of-Spain Electricity Board.

At the end of the year about 57% of dwellings on the routes of the existing distribution mains were taking a supply, and it is evident that Mr. K. W. Finch, the general manager, is hopeful that further extensive expansion will be undertaken in this direction.

He also states that in Trinidad at the present time private generating plant totals some 52 MW, consisting of about 273 prime movers and 123 power stations. As new generating plant is brought into operation and the mains are extended, there should be ample scope here for the Commission to provide a more economic supply for many of the industries. The commission's generating plant at present consists of 7,500 kW of steam plant, which operates as base load, and 7,400 kW of diesel plant, but work is well under way for the construction of the new Penal power station.

In connection with the latter scheme progress is reported on the erection of the 66 kV and 33 kV transmission lines. We note that one section of the 66 kV line was raised to provide a minimum clearance of 27 ft. where it went through cane fields.

The year's working resulted in a net surplus of $1,830 which, although not large, may be deemed satisfactory when it is remembered that tariffs were not increased yet operating expenses rose by $255,238. Total revenue, in fact, increased by $257,775 or 15·5%.

SUPPRESSING TV INTERFERENCE

A REGULATION—The Wireless Telegraphy (Control of Interference from Ignition Apparatus) Regulations 1952—has now been made, to come into operation on July 1, 1953, It deals with the reduction of interference from internal combustion engine ignition apparatus. The main purpose of this regulation is to minimise interference on television receivers and on other short wave equipment.

The regulation applies to ignition equipment on internal combustion engines—with the exception of those used in aircraft and in foreign vessels—coming into operation after July 1, 1953. Equipment manufactured or assembled before that date is exempt. It also applies to cars imported and to vessels within one hundred yards of any moored vessel or on the landward side of a line one hundred yards to seaward of low water mark.

The regulation not only applies to the manufacturer, but also to the user, although the owner of a car, motor cycle, etc. which has been fitted with suppressors by the manufacturer or importer will be considered to have satisfied the requirements if he has kept the suppressors fitted and in serviceable condition.

For vehicles in use, the Postmaster General will continue for the present to rely on the voluntary collaboration of owners.

The requirement laid down in the regulation, is that the field strength of the radiated energy from the ignition system at any frequency between 40 and 70 Mc/s in any direction shall not exceed 50 microvolts per metre at any distance of not less than 33 feet.

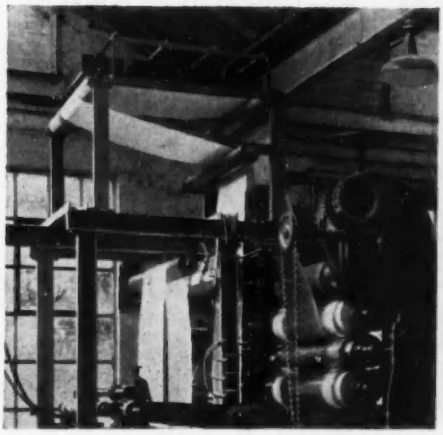
The method of measuring the interference level is dealt with at some length and involves a superhet receiver with an r.f. stage, frequency changer, i.f. amplifier and valve voltmeter output. Attenuators calibrated in db must be provided in the input circuits of both r.f. and i.f. amplifiers. The receiver must be calibrated in terms of a known intensity of c.w. field, must be suitable for use over the range 40 to 70 Mc/s, and must have a tuning accuracy of $\pm$ 1%. Details are also given of required performance characteristics, the aerial and aerial feeder arrangement, the output circuit and other general requirements together with other details for carrying out tests.

The Regulations may be obtained from H.M.S.O. price 6d.

Infra-red Speeds Paper Drying

INFRA-RED heating equipment installed for drying laminated paper boards produced by the British Coated Board and Paper Mills at their Treforest works has the value that it provides a flexible means of continuous drying with little modification to the existing layout. Supplied by Metropolitan-Vickers Electrical Co., the infra-red projector units comprise conventional sheathed elements operating at red heat and trough reflectors of anodised aluminium housed in robust frames.

As the illustration shows, the three-ply coated board passes from a pressure roller, the first stage of moisture extraction, over a series of rollers mounted in a rectangular frame. In its vertical and horizontal travel, the continuous board is subjected to heat from the projector units mounted on the framework. Layout is such that minimum floor space is occupied during the process and at the same time drying is continuous throughout. Such equipment, having a total consumption of 66 kW, provides for convenient moisture extraction without undue outlay and installation costs, and can be adapted to almost any production line.



The layout of the drying plant. Infra-red heaters are mounted along the upper horizontal and down the right hand vertical runs

NEW LITERATURE

Electrical Appliances: Installation and Maintenance *ed. E. Molloy*

CONTAINING practical notes on most of the common home electrical appliances, and on some more usual in factories, this volume is one of the most useful that has appeared in Newnes' "Practical Electrical Engineering" series. It starts off with short articles on the basic home trio—water heating, cooking and refrigeration, all of which are treated helpfully from the aspect of installation, operation, and maintenance. The principles of power factor correction are then discussed, together with methods of application.

Further chapters cover private telephone systems, p.a. equipment, and electric clocks, while there is also a brief discussion of installation methods to be used for radio and TV aerials. Published by Newnes, 196 pages, 9 in. by 6 in. Price 17s. 6d.

Electrical Contractor's Annual 1952-53

ed. J. Rosslyn-Stuart

IT is implicit in the title of this new publication that it will combine information of continuing importance with the discussion of some problems of topical interest. Since the two are not readily separable, it is difficult, on the basis of one year's publication, to present a final judgment. The general impression, however, is that the topical subjects are well chosen, with the accent on domestic wiring, and that the trade section is lengthy enough to be a useful addition to the contractor's reference section.

Topics dealt with at length in articles by individual contributors include notes on estimating, a discussion of the points to watch when installing water heating, ideas on shop lighting, and details of television aerial installations. There is also a somewhat controversial article on the history and application of the domestic ring circuit. All these articles are supported by appropriate tables of data, price schedules, etc. Published by E. and F. N. Spon, 288 pages, 8½ in. x 5½ in. Price 12s. 6d.

Radio Interference Suppression

by G. L. Stephens, A.M.I.E.E.

AS the use of telecommunications equipment extends rapidly, the importance of avoiding unwanted h.f. radiation is becoming increasingly apparent. The basic methods available for securing the desired end are simple and fairly well known; what is too seldom appreciated is the practical method to be adopted in their application. It is in this respect that the present volume excels. It provides an adequate summary of the principles of interference suppression, but no less than 48 of its 107 main pages are concerned with practice in specific cases.

The earlier chapters are concerned with a useful summary of the origin of electrical interference and of the circuits used in this suppression. These are comfortably developed from the aspect of the radio engineer, but with an accent on sound earthing and safety precautions generally that the 50 c/s installation engineer will appreciate. Then comes a discussion of the problems presented by many individual items of electrical apparatus, including those met on shipboard. Characteristics of the components used in interference suppression are next considered, again with the accent on sound engineering practice, and there are short notes on the location of interference source and on suppression at the receiver.

Finally in the wealth of excellent information presented in this compact and moderately-priced volume comes a series of appendices noting the measurement of interference; the requirements of the recent Wireless Telegraphy Act; the use and properties of screened rooms and relevant British Standards. The whole of this admirable book has the easy rhythm which marks it as successfully written for a clearly conceived purpose, and it is strongly recommended to power engineers requiring a brief work on this important subject. 132 pages, 8½ in. by 5½ in., published by Iliffe and Sons, Ltd. Price 10s. 6d.

The Engineer's Approach to the Economics of Production

by J. R. Dick, B.SC., M.I.E.E.

MOST volumes offered to engineers on the subject of economics are written as textbooks. The present volume has a clearness of aim equal to any of these, but the end is no particular examination, but rather the persuasion of the engineer that the study of economics has some practical advantage to offer him. To this end the book presents a discussion of the principles of economics always in relation to efficiency in the technical and commercial senses. Presented in this way, the necessary facts and formulae appear more palatable, and certainly more interesting, than when they appear as steps in the arid argument of a textbook. In the latter part of the book such topics as labour's place in production, and the efficiency of organisation and management, are discussed with an admixture of comment and history that increases the interest still further. Altogether a stimulating book, well worth the careful reading it requires. Published by Pitman, 244 pages, 8½ in. by 5½ in. Price 21s.

BOOKS RECEIVED

A Stitch in Time. Notes on the fundamental principles of electric motor control gear maintenance. Published by Igranic Electric Co., Ltd., Bedford, 8 in. by 5 in. Gratis.

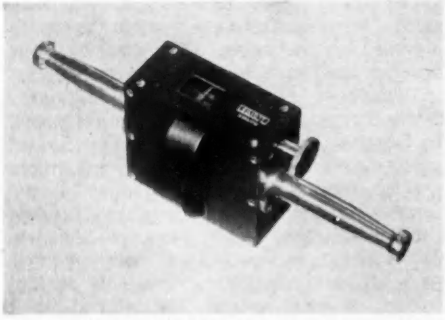
Modern Electric Lamps, by D. A. Clarke. Theory, construction and operational characteristics of the more common types of lamp. Degree standard. Published by Blackie and Son, 205 pages, 8½ in. by 6 in. Price 20s.

The BUYER'S *Column*

A Microwave Attenuator

DESIGNED for low power applications in the 8 to 9 mm. and 3-3·4 cm. frequency bands, a new range of microwave instruments has been developed by ELLIOTT BROTHERS (LONDON) LTD., Century Works, S.E.15. This equipment comprises a precision matched load, a new type attenuator and a three-stub matching unit. In addition, supplementary components and equipment are soon to be introduced.

The attenuator, which is claimed to be a new introduction to this country, consists of three sections of circular waveguide, with rectangular to circular sections at each end, in each of which is fitted a nichrome-coated glass vane. Attenuation is obtained by rotating the vane in the central section, maximum power absorption taking place when this is perpendicular to the outer vanes. A range of 2 dB to 40 dB is said to be obtained, unaffected by frequency variations with accuracies varying from 0·1 to 0·3 dB and, moreover, the value of attenuation can be calculated provided the angle of inclination is known.



Elliott's have developed this microwave attenuator

In the matched load, the absorption vanes, again nichrome-coated glass, can be moved over about three-quarters of a wavelength travel, and by utilising this adjustment, the match point can be found with a greater degree of accuracy.

Siemen's 200 amp Service Fuses

THE latest 200-amp all-insulated service fuse with moulded neutral box and sealing chambers which has been added to the comprehensive range of insulated service equipment marketed by SIEMEN'S ELECTRIC LAMPS AND SUPPLIES, LTD., 38-39 Upper Thames Street, London E.C.4, is designed on similar lines to the standard "R" type 60/80 amp service fuse made by the company.

The new unit will accommodate English Electric Type "RF" cartridges of 100, 125, 160 and 200 amp ratings. It is available with two sizes of sealing chambers—one for 2-core and the other for 4-core cables up to 0·15 sq in.

The neutral box consists of the same moulded box as the fuse but is fitted with a bolted link and flat top lid.

The complete assemblies provide a substantial and neat service fuse set for industrial installations, large stores, flats and office blocks. They are available on a two pole set, 4 pole set, and fuse with handle and cartridge.

Heatrae's "Dandy" Fire

IN order for it to conform with the new British Standard Specification No. 1670 regarding safety guards, HEATRAE LTD., of Norwich, have redesigned their List No. 4332 "Dandy" portable electric fire.

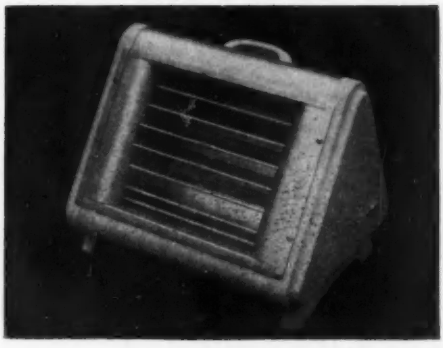
The new model, which we have illustrated, now has the safety guard built into the front of the polished reflector.

The dimensions and details about this well-known appliance have not altered and are as follows: overall size, 13¾ in. high by 16¾ in. wide by 12 in. deep; weight is 12¼ lb. The two rod elements, each rated 1 kW, are switched to permit the use of one or two bars. Each being set in an individual reflector forming one complete and effective reflector as in the previous "Dandy" model.

Fully portable yet firm standing, this model is finished in ivory tan and priced £6 4s. plus £4 10s. 8d. purchase tax.

For occasional use the company put forward their "Pilot" model rated 1 kW. Standing on a wide base with non-metallic lifting handle, this model is available finished in silver green, list No. 4421 or ivory tan body (list No. 4431) on black base. At a cost of £3 8s. plus £2 9s. 9d. purchase tax. The overall size is 13¾ in. high × 18½ in. wide × 8½ in. deep, back to front and the weight is 10 lbs.

The "Dandy" now incorporates a guard to comply with B.S. 1670.



TRADE PUBLICATIONS

FLUORESCENT LIGHTING.—A folder just published by the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2, describes the range of fluorescent lamps available from the company.

CHRISTMAS LIGHTS.—Ekco Joylights and decoration lights are illustrated in a seasonal full-colour leaflet now available from Ekco-Ensign Electric Ltd., 45 Essex Street, Strand, W.C.2.

SAFETY EQUIPMENT.—Machine safety guards, eye-shields, safety boots, p.v.c. protective clothing are included in the range of equipment described in a booklet issued by Industrial Guarding Equipment Ltd., Mill Works, Alvechurch, Birmingham.

AUTOMATIC CONTROLS.—Refrigeration controls, electric control boxes for oil burners and photo-electric flame control gear, motor starters and fuse boxes are all featured in the "Danfoss Journal," published by Danfoss Manufacturing Co. Ltd., Nordborg, Denmark.

HEATING.—Infra-red plant heating using the Stabilag tailor-made heating jacket is described fully in a new illustrated pamphlet issued by the Stabilag Co. Ltd., 1 Broad Street Buildings, Liverpool Street, London E.C.2.

"TELCOHESIVE TAPE"

A self-bonding universal insulating tape

THERE have always been uses for a tape which not only adheres to almost any surface, but forms an inseparable bond with itself and possesses excellent electrical properties.

Telcohesive self-sealing tape manufactured by The Telegraph Construction and Maintenance Co., Ltd., Telcon Works, Greenwich, S.E.10, is such a material. It was originally designed for the manufacture of submarine cable joints. Under these conditions the tape is required to withstand under-water pressures of up to 4 tons per square inch without breakdown of the adhesion. Such joints are expected to last many years and for this reason the ageing properties of the tape must be second to none. Telcohesive tape is manufactured from materials well-known for their excellent ageing properties.

The properties of Telcohesive tape are:—

Physical
Power factor at 1 Kc/s, 9×10^{-4}
Power factor at 1 mc/s, 20×10^{-4}
Permittivity, 1 mc/s, 2·3
Resistivity, $> 10^{17}$ cm.
Density, 0·9 gm/cc.
Vol. co-efficient of expansion (20-60°), 0·0007/°C.
Maximum recommended working temperature, 70°C
Minimum recommended working temperature, —60°C
Taping temperature not below 20°C

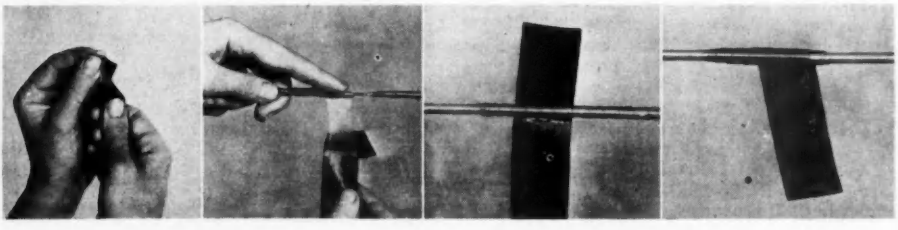
Chemical
Telcohesive tape is unaffected by water, dilute acids, alkalis or salts in solution. It is soluble in hydrocarbon and chlorinated solvents

The tape is supplied in reels 1 in. wide of 10 yards. A backing tape is wound in the reel to prevent self adhesion. The backing tape detaches itself from the adhesive during taping.

Telcohesive tape is a translucent, very extensible material which is easy to use merely by wrapping round the materials to be joined whilst maintaining tension and ensuring a slight overlap between turns. The tape may be used for making watertight joints between all known cable insulations, also between lead sheathed cables and those sheathed with thermoplastics or V.I.R., and for making flexible waterproof joints between vertical aerials and their mountings. Successful high voltage power cable joints in the field have also been made.

After application, the tape should always be backed by another tape resistant to abrasion, cutting and ultraviolet light, for although Telcohesive is ideal for the purpose for which it was designed (as a sealing compound) it is recommended as the final material of a joint only when the joint is of a temporary nature or is so treated that it is not subject to physical pressure. Any black fabric tape is ideal as a backing for Telcohesive. Alternatively P.V.C., black polythene or rubber tape has been found satisfactory.

These pictures illustrate the method of insulating a joint using Telcohesive tape



Rapid Expansion in Rhodesia

Commission Reports 36% Increase in Units Sold

AN increase of over 21% in units sold during the year ended March 31 last reflects very rapid development on the part of the Electricity Supply Commission of Southern Rhodesia. It must be stressed, however, that the rise was not due to any abnormal expansion on the part of mining or other industrial consumers. In fact, for domestic and lighting purposes alone the Commission records an increase in units sold of nearly 35% during the year.

Total sales for the period actually increased over 36% to nearly 355 million units, but the latter amount includes some 40 million units supplied to the City of Salisbury during 10½ months of the year under a new agreement.

Mining concerns took 190 million units, an increase of 20%, industrial consumers 51·4 millions (17% up), and farmers 10·7 millions. This latter figure is an increase of 41%, but it is pointed out that the average consumption per farm connected rose only by 8·55%. For, as in many other countries, it has been found that far too many farms still confine electricity to domestic use. To combat this tendency an extensive sales campaign at farmers' meetings has been carried out by the Sales Development Section, and results so far promise well. The number of farming consumers increased by 362 during the year, to a total of 1,565.

Power Cost per Unit

The year's operations resulted in a net surplus of £57,879. Although the price of coal increased by nearly 40%, the average cost per unit sold dropped slightly to 0·804d., due to the use of recently installed higher efficiency plant. Better still, there have been no alterations in tariffs, and none is yet contemplated, we understand, apart from an adjustment of the minimum monthly charge under the farming tariff which had been set too low.

But attention is drawn to the increasing cost of capital plant. Examples are quoted showing that for a 20,000 kW generator the tender price in November, 1945, was £138,009, but the final cost amounted to £177,755. In January last a duplicate set was ordered at a tendered price of £229,810 (a rise of 66·52%). During the intervening period the cost of money has increased so that the annual capital charges to be met on this unit have increased from £0·54 to £1·072 per kW—that is, by 98·52%.

Apart from supplying in bulk to half a dozen local authorities, the area of the Commission is divided into six regions for operational purposes—Bulawayo, Gwanda, Central, Umtali, Salisbury, and Shabani. The largest of these is the Central Undertaking, which has an 11 kV distribution system totalling over 1,100 miles. In this area over 167 million units were sold—nearly half of the Commission's total—of which mining alone accounted for 75 million units.

Power Plant

Turning to the generation side, the installed capacity of all the Commission's power stations was increased by 7,500 kW to 82,370 kW during the year. But there is on order or under construction plant for a further 102,500 kW. Of this, 80,000 kW is for the Umniati "B" station in the Central Division, and 20,000 kW for Shabani No. 2 station. At the Umniati "B" station much of the plant for the first two 20,000 kW generators and associated boilers is under construction and is expected to be in operation next year. The remaining two 20 MW sets are to be installed in succeeding years, bringing the station's capacity up to 120 MW in 1955.

Heavy rains hampered the work of extending the transmission and distribution systems, but nevertheless an additional 746 route miles were constructed, bringing the total in service to 5,448 route miles. Without in any way impairing efficiency or service reliability a proportion of the past increases in transmission and distribution costs have been met by progressive modification of design and improved handling and construction methods. There is, nevertheless, a limit to which such devices are carried, and the report records a higher cost per mile of line constructed.

There are also some notes, too, on the increased cost of generating plant, and on the general difficulty in recruiting native labour except in the larger towns. It is stated that there is a growing reluctance to accept heavy or dirty work such as coal lashing, ash handling and pole digging. It is not economical to mechanise such work in all cases, although some development in this direction has been undertaken, enabling the expansion recorded during the last three years to be achieved with a relatively static native labour force.

The WEEK in NEWS

Import Quotas for Jan.-June Period

Value of Imported Electrical Goods down by £55,000

LAST week, the Board of Trade announced the import quotas of goods affected by the November 1951 and March 1952 import restrictions, for the first half of 1953. It will be recalled that the March restrictions affected numerous electrical goods and the quotas for these items may be found under Schedule II of Notice to Importers No. 527. Those concerned were invited to apply for licences in respect of imports during the early part of next year, by November 12. As previously announced, account will be taken in calculating individual imports on the value of goods brought in by those firms in previous periods.

Probably the largest group of electrical items covers the smaller appliances. They include cookers, vacuum cleaners, floor polishers, irons, toasters, shavers, kettles, fans, blankets and pads, coffee percolators and bells and buzzers, and have been given a quota value of £40,000. The section relating to lamps and lighting fittings will have a quota of £75,000; and finally the miscellaneous items covering washing machines, lawn mowers, and refrigerators not exceeding 12 cu ft capacity, have a quota value fixed at £25,000. The last-mentioned value is the same as that fixed for 1952, but the other two are considerably smaller. The £40,000 compares with £70,000 and the £75,000 compares with £100,000, established for the latter part of this year. In addition many of the quotas fixed for 1952 have been exceeded, due to the fact that some firms had entered into contracts larger than their share of the quota before the restriction was imposed.

This country is still unable to make any general relaxation in her import restrictions as the balance of payments situation still does not merit it. It has been found necessary to keep the level of quotas considerably below the 1951 rate of imports.

Copper Restrictions off: Price lowered

THE restriction imposed last month on forward purchasing of copper (see our November 6 issue) has been withdrawn, the Ministry of Materials announced last week. Consumers will be able to buy copper for delivery in the current and succeeding months up to the full limit of existing allocations. Forward purchases for December delivery were limited to three-quarters of the November allocations, following the strike of African workers in N. Rhodesia. The Ministry's buying price for rough copper has been reduced from £235 to £200 per ton.

Reports, hitherto unofficial, indicate that the Government will shortly announce that copper or its alloys may again be used in the manufacture of articles in which its use at present is banned.

NEW COMMITTEE TO DEFEND ELECTRICITY

A NEW committee has been set up at the instigation of the B.E.A.M.A. Council to initiate measures for electricity development, and to take counter action as regards anti-electricity propaganda. It will be known as the B.E.A.M.A. Electricity Development Committee and will act in close liaison with E.D.A. Of particular interest to the committee will be the domestic field of comfort heating, cooking and water heating, which has been attacked repeatedly in the past few months.

Anglo-U.S. Tie-up

AN agreement has been concluded between John Brown and Co., Ltd., and Riley Stoker Corporation of Worcester, Massachusetts, whereby the former company is licensed to manufacture and sell to Riley's design, components and complete steam generating plant and equipment for use in power stations. The American firm is one of that country's leading suppliers of generating plant, and their experience in that field will also be available to John Brown and Co. in the future. On the other hand John Brown's manufacturing resources will probably make Riley steam generating plant more readily available throughout the world.

The First Half-Century

TO ELECTRONS

Little Bags of mystery
Lately come within our ken,
What may your relations be
To the seventh power of ten?
Lurkers in atomic holes,
Lilliputs in Brobdingnags,
Does the ion pierce your souls?
Are there souls within your bags?

From our issue of December 4, 1902.

FINE ART COMMISSION ON STREET LIGHTING

LAMP standards are singled out for special comment in the Tenth Report (1950 and 1951) of the Royal Fine Art Commission. In spite of the Commission's efforts to improve the standard of design by advice to manufacturers through the Association of Public Lighting Engineers, it is considered that all too often the equipment chosen for a particular area is quite inappropriate, and the combination of post and lantern incongruous.

There is mention in the report of an agreement to which the Ministry of Transport, Council of Industrial Design, and A.P.L.E. are all parties. This provides for the Council to give advice to manufacturers of lighting equipment on the design of standard products. The Commission continues to advise local highway authorities on the choice or design of equipment for particular areas. Such advise was given during the period reported upon to the L.C.C. in connection with Waterloo Bridge and the Lansbury Estate, and to the new town corporations of Newton Aycliffe and Harlow.

A problem which has received special attention has been the lighting of trunk roads where they pass through places of outstanding architectural character, such as Bath and West Wycombe. The problem is admitted to be a difficult one. The Ministry of Transport insists on a minimum standard of illumination, and agrees to make a financial contribution if the equipment is of a type passed by the Commission. Similar problems arise in the lighting of bridges of special architectural interest.

The report notes that during the two years reviewed, the Commission gave advice on the design of 11 new power stations.

Royal Society's Work in its 290th Year

MEDALS and awards to a number of distinguished scientists were presented by the President, Dr. E. D. Adrian, O.M., at the Anniversary Meeting of the Royal Society on Monday last. Some of these were noted on page 887 of our issue of November 13. In his remarks on the work of the past year, the 290th of the Society's existence, the President made special reference to the reduction that had been achieved in the delay between the receipt of a scientific paper and its publication in the Society's "Proceedings" and "Transactions."

In the field of finance, he referred particularly to the increasing cost of preparing abstracts, and took the opportunity of thanking industrial firms which had contributed towards this.

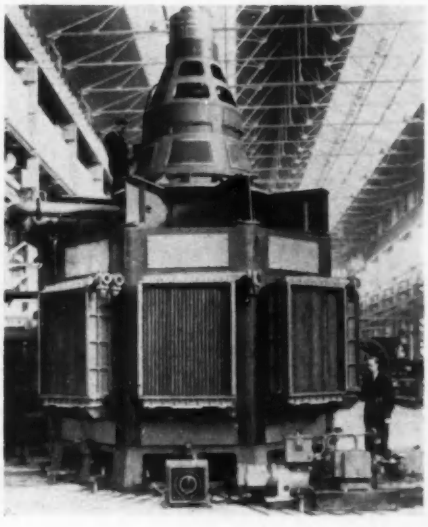
Dr. Adrian completed his address with a survey of our developing knowledge of the mechanism of the nervous system. He made special reference to the electrical effects involved. Rapid progress is taking place, he said, in the study of the bio-physical problems arising from the phenomena of animal electricity. He quoted the case of an electric eel which could detect its prey (a small fish) because of its high conductivity. In civilised surroundings it was often found to have swallowed scrap metal by mistake.

M.P's. PAMPHLET TO BOOST ELECTRICITY

PARLIAMENTARY voices were raised in defence of electricity's contribution to fuel economy when, last week, an *ad hoc* committee under the chairmanship of Sir Arnold Gridley, K.B.E., M.I.E.E., M.P., published a booklet "Electricity and its place in greater fuel economy." Introducing the publication, Sir Arnold stressed the need for greater publicity for electricity and the value of its increased use, pointing out that a prolonged recession in demand might leave area boards no other alternative to raising tariffs. One present injustice which, he felt, should be removed, was the disparity in P.T. between gas and electric appliances.

Training Course for Commercial Staff

A FURTHER series of training courses for service centre assistants, demonstrators and housecraft advisers of the S.E. Scotland Electricity Board, has just been completed. Each lasted five days during which time a wide variety of problems were discussed with Board officials, manufacturers and E.D.A.



One of five 25 MW, 11 kV, 600 r.p.m. vertical shaft alternators being made by the G.E.C. for Tungatinah power station of the Tasmania Hydro - Electric Commission. Three similar alternators (428 r.p.m.) are also being made for Scotland's Errochty power station as well as a horizontal shaft machine for Aura Kraftonlegg station in Norway

OFFICIAL PUBLICATIONS

U.N. ECONOMIC BULLETIN FOR EUROPE (*see page* 1018). H.M.S.O. 3s. 9d.

VOLTA RIVER ALUMINIUM SCHEME. *Command Paper No.* 8702 (*see page* 1010). H.M.S.O. 9d.

ROYAL FINE ARTS COMMISSION. *Report for* 1950 *and* 1951. *Command Paper No.* 8697 (*see page* 1037). H.M.S.O. 9d.

WIRELESS TELEGRAPHY (*Control of Interference from Ignition Apparatus*). *Regs*, 1952. H.M.S.O. 6d.

BRITISH STANDARDS

B.S. 88: *Electric Fuse for Circuits of Ratings up to* 660 *V.*

B.S. 816: *Requirements for Electrical Appliances and Accessories.*

L.C.C. XMAS LECTURES

FOLLOWING our announcement last week of the I.E.E.'s Christmas lecture, the L.C.C. has given details of its annual series of talks for school children. There will be 12 lectures in all, to be held at various centres in London between December 29 and January 2. On New Year's day Mr. E. B. Sawyer will speak on the production of light, its control, and uses, at the Lighting Service Bureau. Radar and Television are other subjects, which will be dealt with on December 31, and among the remaining nine lectures will be those on Dickens, Ships, Space Travel, Reptiles, Music, Science, Navigation and Rain-making.

E.A.W. Conference on Fuel Situation

WOMEN from all parts of the country gathered at the I.E.E.'s London headquarters last week at the invitation of the E.A.W., in an effort to end the bewilderment over the fuel situation. The main question which required answering was whether women were wrong in wanting to use electricity in home as they had been doing in the past. Those asked to supply answers were Mr. R. Y. Sanders and Lady Railing.

Mr. Sanders, in the course of his address, emphasised the Electricity Supply Industry's attitude of allowing the consumer complete freedom of choice as to the fuel he used. There was, he said, no clear-cut evidence available of any national advantage which could be gained from the use of any particular fuel. As regards comfort heating, he said it was probably true that more coal was used by electricity than by the open fire for continuous heating, but the reverse was true for short-period heating. Electricity was most convenient for water heating in the summer, and as for cooking, there was insufficient evidence to show that one fuel was more economical than another. Mr. Sanders added that for a politician to state in the House that cooking by electricity required 2½ times the coal that gas does was arrant and ridiculous nonsense.

Electricity was only short at peak periods, Mr. Sanders went on, but load characteristics in the electrical industry were better than most other public services. It had also been forgotten that without the complementary domestic load, the cost of power to industry would be materially higher.

Lady Railing gave some views on electricity in the home from the housewife architect's aspect. She mentioned particularly the need for more efficient insulation in homes to conserve heat. This question was taken up and its advisability heartily endorsed during the ensuing discussion.

This photograph was taken outside a new block of flats in Vauxhall, London, as prospective tenants arrived to take a look at their new homes. The occasion was an excellent example of good salesmanship because as tenants arrived they were met by a man from the Electricity Board (Lambeth) with a full range of kettles, fires, stoves and other small appliances, together with a mobile showroom. Unfortunately, across the road the Gas Board has already started delivering their cookers

Electrical Firm's Appeal

IT is reported that J. and F. Stone Lighting and Radio Ltd. and Chain Store Finance Trust Ltd., defendants in the Hire Purchase case, have given notice that an appeal is to be lodged against their conviction. As reported in these columns last week, the companies were each fined £5,000 and were ordered to pay 150 guineas costs for contravening the provisions of the Hire Purchase and Credit Sales Agreements (Control) Order, 1952.

New Dielectric Developed

DEVELOPMENT of a new dielectric material, which is obtained by heating pure titanium dioxide to a temperature of 1,400° C, is claimed by an Italian engineer, L. Nicoli. Although the material appears to be pure rutile, it has quite different dielectric properties. It's dielectric constant falls from about 10,500 at low frequencies (10 c/s) to 100 above 10^5 c/s, while tan θ peaks at a value of 3·2 at 13,000 c/s. The material is described as exhibiting a Debye type of loss with a very high static dielectric constant.

Lighting for a Concrete Ceiling

THE ceiling design of the canteen at Chelmsford for employees of Marconi's Wireless Telegraph Co., must surely be unique for such a situation. The effect is pleasant and undoubtedly enhanced by the lighting installation. This consists mainly of twelve continuous features, each 60 ft long, specially designed and produced by Edison Swan Electric Co., Ltd. Lighting fittings have been mounted close to the ceiling on either side of the six concrete barrel roofs. All the cable and control gear have been housed within the fittings, and the lamps enclosed in "Perspex" covers. The covers have been designed so that each section can be inserted behind its neighbour while replacing lamps, cleaning, or carrying out repair and maintenance work. Lamps used are 5 ft 80W fluorescent tubes. Additional illumination is provided by recessed fittings.

The division between two of twelve concrete ceiling bays in the canteen of Marconi's Wireless Telegraph Co.'s works at Chelmsford, lit by continuous rows of fluorescent lighting fittings. Each bay is 40 ft wide and 60 ft in length

This canteen was built under the direction of the architect, Mr. E. R. Collister, and the electrical installation was carried out by Edmundsons Electrical Co., Ltd.

Electricity's Place in Industrial Productivity

INDUSTRIAL progress centred around the development of electricity, was the statement amplified by Mr. G. T. Garwood, sub-area manager of the S. Western Electricity Board, in his address at the annual dinner of the Exeter branch of E.C.A. The most successful nations in the world today, he said, were those with the highest industrial productivity, and these were always the biggest consumers of electricity. The electrical industry's task was to step-up productivity through increased use of electricity.

As regards contracting, Mr. Garwood said the Boards had only entered that field when satisfied that public demand existed, and then only on the strict principles of fair trading.

HOOVER WEEK

TO coincide with early Christmas shopping, Hoover, Ltd., have arranged a special "Hoover Week" to end on December 6. Special advertising and display media have been provided, and the main theme of the week is an offer of a two-days' free loan of a popular appliance.

RISE IN COSTS WILL NOT AFFECT TARIFFS

THE British Electricity Authority announces that despite recent increases which the Electricity Supply Industry has had to face in salaries and wages, freight charges and interest charges, they do not contemplate any immediate general increases in electricity tariffs. They are hopeful that in the present national situation it will be possible to avoid any further general raising of charges to consumers, notwithstanding the continuing risk that the industry might for the first time incur a deficit in the current financial year.

It should be clearly understood however, that if the increased costs now being borne are aggravated by any of the financial burden of substance, immediate general increases of charges would be unavoidable. The Authority point out that their decision does not affect adjustments of tariffs that are now being made.

Electronic Brains in All Offices

A FORECAST that all offices would possess an electronic brain in the near future, was made by Sir Geoffrey Vickers at the autumn conference of the Institute of Management. He said that calculating and card punching machines occupied more and more space in large offices: within a generation we should all have an electronic brain in the basement.

Speedy Calculations for Canadian Seaway

WE have recently had information on the activities of Madam and Ferut, two electronic computing machines made by Ferranti, Ltd., in Manchester. They are two of seven such machines being produced by the company. Madam, the first, was installed at Manchester University last year. The second, Ferut, emigrated to Canada, and is now engaged on working out the flow of water down the new St. Lawrence Seaway. This task, incidentally, was originally anticipated to take about 20 years, but Ferut is expected to complete the job in a few hundred hours. The remaining machines will undertake important computations in this country and elsewhere.

Domestic Appliances Show in Chicago

EXHIBITIONS in the U.S.often present manufacturers in this country with an opportunity of either gaining a small foothold in the American market or of further advertising. Manufacturers of small domestic appliances may therefore wish to make plans for two exhibitions being organised by the National Housewares Manufacturers Association for 1953. The first is to take place in Chicago between January 15 and 22, and the second in Atlantic City from July 13 to 17. Both will incorporate displays of electrical appliances, including kitchen furniture and laundry equipment. The 1952 Chicago Show proved a popular venture for some 600 exhibitors. U.K. firms interested in the forthcoming Show are advised to communicate early with the Association's Mr. A. W. Buddenberg, at 1140 Merchandise Mart, Chicago 4.

Board Asked to Stop Selling Appliances

LOCAL contractors and shopkeepers have protested on a number of occasions against the Electricity Boards' trading in domestic appliances and equipment. Particular exception has been taken to the nationalised industries' participation in hire-purchase sales as, it is contended, the Boards have an unfair advantage in being able to finance such transactions. The E.C.A. now has the support of the Central Committee of Scottish Chambers of Commerce. The general secretary of that body has stated that since vesting-day area boards had increased their sales of equipment from £1,600,000 to £10,600,000, much of which was under H.P. agreements. The committee decided to ask the boards to stop the practice.

NEW CABLE DESIGN?

A NEW type of cable has been produced by British Insulated Callender's Cables. It is probably the only piece of cable of its kind in the world, and a demonstration length was presented to Mr. D. T. Hollingsworth, chief engineer, at a staff social at Seymour Hall, London, recently. The cable closely resembles a standard type of B.I.C.C. mass-impregnated non-draining cable. The new cable is not expected, however, to sweep the market. Process of manufacture involves cake mixture and marzipan and the "inventor" was the chef at Seymour Hall. About 400 members of the staff of B.I.C.C. attended the dinner, dance and cabaret.

Other Shows in U.S. During 1953

FURTHER to the above paragraph concerning forthcoming exhibitions in America, information has been received about two others. The 1953 Radio Engineering Show is to take place in New York between March 23 and 26. It is open to all manufacturers of radio, communications, television and electronic control equipment. Organisers are Clapp and Polliack, 341 Madison Ave., New York. The second, which may attract some U.K. manufacturers, is the 28th exhibition of the U.S. National Office Machine Dealers Association, arranged for June 18 to 20 at the Ambassador Hotel in Atlantic City. Organiser in this case is the Association's Mr. Harold W. Mann, 1267 N. Wilton Place, Los Angeles 38.

Viscount Hall Reminisces

PRINCIPAL speaker at the Batti-Wallahs' luncheon last Wednesday was Viscount Hall, who gave some off the record reminiscences of personalities and events during his parliamentary career, and while he was First Lord of the Admiralty. The gathering on this occasion was swelled by the presence of members of the B.E.A. coordinating committee. The next luncheon will be on January 28, 1953.

NEWS IN BRIEF

Yet another branch of E.A.W. has been formed. It is at Ashton-under-Lyne, and is under the chairmanship of Mrs. Shires.

We sincerely thank Brook Motors, Ltd., for the pleasing calendar which reached us last week-end. It depicts 12 of the many uses to which the company's products are put.

Cost of illuminating each of Glasgow's pedestrian crossings is reported to be £103 4s.

An increase of 2d. an hour, as from November 4, for skilled and unskilled men in Ulster, has been awarded by the Joint Industrial Council for the Electricity Supply Industry in N. Ireland.

A selective exhibition of current British Industrial design will be one feature of the U.K. Pavilion at the Rhodes Centenary celebrations at Bulawayo, S. Rhodesia, next June.

Some 600 people attended the Amateur Dramatic Society of W. T. Glover and Co., Ltd.'s production of "Worm's Eye View."

An exhibition of approved Coronation souvenirs is now on show at the Council of Industrial Design premises at Tilbury House, Petty France, S.W.1. It closes on January 24.

Speaking at a meeting of the Universities Federation for Animal Welfare, Dr. Phyllis Croft advocated alterations to electrocution cabinets used for destroying domestic animals. Modification involves immediate stunning by passing current through the animal's brain. An initial 12-second period of consciousness before death is thus removed, and the voltage reduced from 2,000 V to 230 V.

In our issue of November 20, we published an account of a new stored energy device developed by the Brush Electrical Engineering Co. for operating circuit-breakers. This was demonstrated on a Type OR.38 oil circuit-breaker which has a short-circuit rating of 750 MVA, not 75 MVA as was stated in the article.

Questions in Parliament . . .

Tax on Fluorescent Tubes

Mr. J. Boyd-Carpenter said on Thursday that the exemption of fluorescent hot cathode tubes from purchase tax was being considered.

University of Technology

The House has been told that an announcement of the Government's decision concerning the choice of a technical college or institution for the future University of Technology would be made shortly.

District Heating

The Parliamentary Secretary to the Ministry of Works stated in a written answer that the report on district heating by the Heating and Ventilation (Reconstruction) Committee of D.S.I.R.'s Building Research Board had been received. It would be published as Vols. 31 and 32 in the series of Post-war Building Studies as soon as possible.

Export Incentives

A question was asked last Thursday concerning the introduction of export incentives and whether any conclusions had been reached. It was stated that consideration was being given to the views of various trade and national associations. The House was assured that support would be given to any sound and practical suggestion for encouraging exports.

Consultative Council Criticised

Mr. G. Lloyd was asked whether, in considering the re-appointment of members of the S.E. Electricity Consultative Council, he would bear in mind that the Council had failed to protest at certain anomalies and disproportionate increases which had taken place. The Minister said he appreciated the grievance, but drew attention to the Council's recent report. He also said he would examine any correspondence on the matter.

Denationalisation?

Asked if legislation would be introduced to restore the former Central Electricity Board and Electricity Commissioners, and decentralise control of generation, Mr. Geoffrey Lloyd stated in a written answer on Friday, that the matter would be considered when the existing organisation of the industry was reviewed.

Tax on Wireless Batteries

During the financial years ending in 1951 and 1952, the yield of purchase tax on both wet and dry batteries was £1·3 million and £1·5 million respectively. Mr. R. Butler said he had no figures for dry batteries alone.

Defence Contracts

In a written answer last week, the Parliamentary Secretary to the Defence Minister stated that between one-seventh and one-eighth of the output of the engineering industry was represented by defence contracts.

TV at Brighton

Mr. D. Gammans informed the House that he hoped to make an announcement soon concerning the grant of a licence for the installation of a television amplifier at the Dyke, Brighton.

R.A.F. Electrical Contracts

The comparative values of internal wiring contracts placed by the R.A.F. with the electricity boards and private contractors was the subject of a question in the House last week. The Under-Secretary of State for Air said that contracts valued at £276,000 had been placed with the Boards and at £857,000 with private contractors.

Electricity in Scotland

Supply of electricity in Scotland, referred to in the Queen's Speech, was again queried in the House last week. Mr. Palmer asked firstly if the views of the chairman and members of the N. of Scotland Board had been sought, and secondly whether in examining the question consultations would take place with trade unions representing all grades of employees in the electricity supply industry. In reply Mr. Henderson Stewart said the chairman had expressed his views and the Minister of Fuel and Power was aware of them. Consultations would take place soon with all the Scottish Boards, and any views which employees' representatives wanted to express would be welcomed and considered.

Fuel-Saving Equipment

The Ridley Committee's recommendations concerning Government assistance in the installation of fuel-saving equipment would be discussed with representatives of industry at an early date, Mr. Geoffrey Lloyd told the House last week. He had been asked whether the present scheme for assistance would be expanded or amplified on more attractive terms. Answering a supplementary question, the Minister said he understood manufacturers were already developing designs of high-efficiency open fires on the lines recommended by the Committee.

Replacement of Trams

The effect of the conversion of tram routes to motor bus operation on fuel supplies was queried by Mr. G. Nabarro. In his replies to questions the Minister of Fuel and Power said the replacement may result in an increase of some 20,000 tons a year in oil consumption and a decrease of about 100 million units of electricity a year. The Government's policy was not to interfere, on fuel grounds, with the free choice of types of vehicle, he said. The Minister agreed that the transfer to buses would involve additional strain on tanker tonnage in the event of war, but the quantities were relatively small. He pointed out the smaller risk of disturbance, and flexibility of a petrol vehicle in the event of air attack.

Electric Supply News . . .

Belfast

Reporting to the City Council on Monday, Mr. R. P. Watson, acting city electrical engineer, argued that no time should be lost in placing orders for the buildings and plant in connection with extensions to Victoria power station. He stressed that two new turbo-alternator sets had to be in service before the winter of 1956-57 to meet the anticipated demand. The Council decided to proceed with plans for this extension, and also approved an increase in estimates of £926,750.

Keadby

The second of six 60 MW turbo-alternator sets at Keadby power station, Yorkshire Division, B.E.A., was put into commission a few days ago. The first set started operating earlier this year.

Lowick

The Council has decided that power lines shall go down the Main Street, as originally suggested. This was in opposition to a recommendation of the Planning Committee, which proposed that there should be two lines running behind the houses on either side of the Main Street.

Northumberland

The County Planning Committee has approved the construction of a 20 kV overhead line to supply electricity to the village of Blanchland. The low tension supply system in the village itself will be put underground.

Repton

The parish council has decided to oppose a proposal of the B.E.A. to erect a new generating station within two miles of the village. The council says it would "spoil the village's old-world charm and antiquity" and wants the proposed site moved farther away. It has pointed out that Repton School, which pays a large proportion of the local rates, would lose much of its attraction as a country public school if it had the power station as a neighbour.

Tynedale

Although the Ministry of Fuel and Power has approved the route of the proposed 275 kV overhead line from Blaydon-on-Tyne to Carlisle, farmers in the Tynedale area are to continue their opposition to the scheme by refusing to grant wayleaves.

LIGHTING SCHEMES

Clevedon.—The Finance Committee has approved the scheme for converting street lighting from gas to electricity, at a cost of approximately £2,700.

Darlington.—T.C. has received consent to borrow £4,470 for improving lighting in Coniscliffe Road.

Exeter.—T.C. recommended to prepare a scheme for lighting of Church Lane, Heavitree.

Heywood.—The M.o.T. has rejected the application to proceed with £4,000 scheme for conversion of side street lighting to electricity.

Newark (Notts.).—M.o.T. has given preliminary approval to the scheme for an extension of the trunk road lighting from the junction of Victoria Street with Mill Gate to the borough boundary.

Oldham.—Following discussion on the damage done to street gas lamps by recent stormy weather, the borough surveyor has been instructed to prepare a programme for gradual conversion to electricity.

Company Activities . . .

Aerialite Ltd.

Again an increase in turnover of 20% is reported. The profit before taxation, also, was 12% up on last year, and is a very satisfactory result from a year of many difficulties. All departments were fully occupied and certain new products were in very heavy demand. There is good news that the restriction caused by lack of factory space will be shortly overcome, for having obtained a licence after six years of continuous application, an extension is now being built, states Mr. L. S. Hargreaves, the chairman. The subsidiary, Nettle Accessories, too, has done well.

Year to May 31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	169,070	59,820	367	170	18/9	13/–
1949	146,157	51,434	281	170	15/10	12/10
1950	144,569	54,020	158	112½*	9/1	7/1
1951	182,018	67,548	179	88½	9/7	6/9
1952	198,115	68,211	144	88½†	9/–	7/10

* Capital bonus 87½%. † on increased capital.

Barton and Sons, Ltd.

An extraordinary meeting is to be held on December 22 to consider a proposal to capitalise £101,250 and issue to stockholders bonus shares in the proportion of one for four held.

Brook Motors Ltd.

The virtual collapse of export markets created a rapid change in the order book during the year covered by this report, states Mr. Frank V. Brook, chairman. Production quickly overtook demand, with the result that many standard machines can be obtained at short delivery. But there are

definite signs of a trade revival on the home market while overseas trade is improving, he reports. The firm's hardest markets are now the continent of

Year to Sept. 30	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1950	388,333	148,050	52	17½	—	—
1951	556,138	219,870	78	20	38/6	32/6
1952	761,194	243,491	105	20	34/3	31/6

Europe, where German competition is severe, and Egypt, where in spite of the upheaval, representatives have managed to keep sales alive, although on a reduced demand. More encouraging is his reference to a new factory at Barnsley which should be in full production possibly by the end of this year. The turnover was a record.

British Electric Resistance Co.

Another increase in the trading profit is recorded in the accounts for the year to July 31, and it is proposed to raise the dividend by 5%. The trading profit shown in our accompanying table

Year to July 31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	35,769	8,675	31	20	5/1	3/-
1949	38,300	11,991	44	20	4/6	3/6
1950	30,560	10,852	40	20	4/4	3/9
1951	39,917	10,483	40	20	4/6	3/6
1952	51,934	11,497	44	25	3/9	2/6

includes £383 from the wholly-owned Canadian subsidiary, International Power Transformers Ltd. Total current assets are listed at £199,323 compared with £168,347 for the previous year.

Dewhurst and Partner

With an increased profit for the year ended September 30 last, the dividend has been raised. On capital increased by 200% share bonus, the final dividend is 15%, making a total of 19% for the year. For the previous year the interim of 10% was paid on the smaller capital and a final of 12½% on the larger amount.

Dowding and Mills

Output of the Camp Hill Works continues to increase, states Mr. K. H. Sharp, chairman. The turnover for the first four months of this year is in excess of that for the corresponding period of the previous year. The London factory, however, is only making slow progress and many difficulties have yet to be overcome. During the year negotiations were completed for borrowing £40,000 from Industrial and Commercial Finance Corporation

Year to June 30	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	42,759	17,070	262	100	14/3	11/10
1949	48,166	18,244	70*	37½*	17/9	4/1½
1950	58,441	21,603	83	50	7/10½	5/–
1951	58,039	15,032	60	50	9/3½	7/3
1952	68,706	16,235	65	50	7/–	6/–

* 300% capital bonus.

Ltd., secured by debentures on the whole of the assets. This loan is to be repaid in ten yearly instalments.

Thorn Electrical Industries

The company is offering to shareholders £500,000 5½% Unsecured Loan Stock, 1959-64 at par. Regarding prospects, the directors think it probable that the current year's net profit will be lower than for last year, but are confident it will exceed the last 10-year average.

Dividends Declared

Belliss and Morcom.—Interim of 4% (*same*).

Hick, Hargreaves and Co.—Interim of 5% (*same*).

Johnson and Phillips.—The interim is again 7½%, as we noted on November 20. But the other statement in that issue, concerning trading for 1952 running at a substantially lower level than last year, does *not* apply to that company—it relates to Jensen and Nicholson. We apologise for the transposition.

Johnson, Matthey.—Interim of 3%.

Lisbon Electric Tramways.—Interim of 2½% tax free.

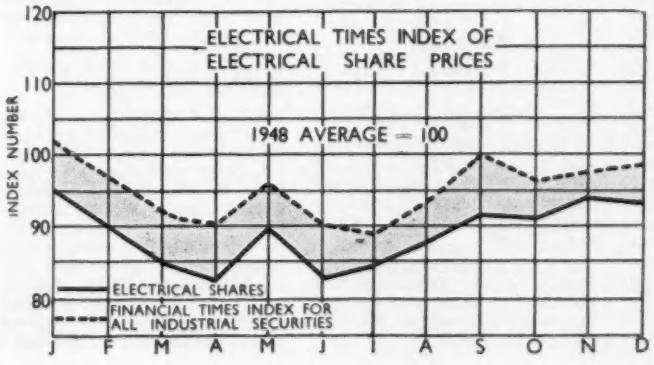
London Electrical and General Trust.—Interim of 3% (2½%).

Louis G. Ford.—Interim of 10% (*same*).

Oriental Telephone and Electric Co.—Interim of 4% (*same*).

Sperryn and Co.—Final dividend 8% making 12% (*11½%*). Consolidated profit £136,513.

Telephone Rentals.—Interim of 4% (*same*).



Both indices remained fairly steady during November. A slight rise occurred in the index for all industrial shares, while that for electrical shares fell by a small amount. The "Financial Times" index for the former rose from 97·4 to 98·7. Latest "Electrical Times" figure for electrical shares only is 93·2, showing a fall of 0·8. These figures are based on the average prices ruling during 1948

Commercial Information

CONTRACTS OPEN

HOME

Dec. 5.—Harrow U.D.C. Supply and installation of 197 140 W sodium lanterns, lamps and control gear in Group A, for various roads. Engineer, J. H. Melville Richards, Council Offices, Uxbridge Rd., Stanmore. Deposit £2.

Dec. 5.—Swanage U.D.C. Supply and erection of 78 open-type 140 W sodium lamps and 43 open-type 60 W sodium lamps with concrete columns. P. S. Browne, Surveyor, Town Hall.

Dec. 6.—Birkenhead T.C. Electrical installations at Christ Church, C. of E. school. Names by above date to Leonard Barnish, 58 Rodney St., Liverpool.

Dec. 6.—Bridgend U.D.C. Supply and installation of sodium and fluorescent lighting in Class A, along various roads in borough. Engineer and Surveyor, Council Offices, Glan-Ogwr, Bridgend. Deposit £2 2s.

Dec. 8.—Inverkeithing T.C. Electrical work in erection of 102 houses on Spittalfield site. Applications by above date to W. T. Thomson, interim town-clerk, 17 Heriot St. Deposit £2 2s.

Dec. 8.—Liverpool. Partial renewal of electrical installation at William Roberts Baths. Baths Manager and Engineer, 62 Fontenoy Street.

Dec. 8.—Northern Ireland. Electrical installation in 24 houses at Kilrea for N.I. Housing Trust, 12 Hope St., Belfast. Deposit 10s.

Dec. 8.—Spalding R.D.C. Supply, erection etc. of pumping machinery. One pump to be driven by electric motor and other by diesel engine, each complete with switchgear and ancillary equipment. Consulting Engineers, Silcock and Simpson, 10 Park Row, Leeds. Deposit £5.

Dec. 8.—Swinton and Pendlebury T.C. Supply of 12 illuminated pedestrian crossing beacons. Borough Engineer and Surveyor, Town Hall.

Dec. 8.—West Hartlepool T.C. Supply installation, etc., of electrically driven sewage pumps and ancillary plant and equipment. Borough Engineer and Surveyor, Municipal Buildings.

Dec. 8.—West Riding. Renewal of electrical installation in Goole grammar, and Henley C.E. schools. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £2 2s. (See Nov. 20 issue.)

Dec. 9.—Belfast. Supply and installation of earth leakage trip switches, earth electrodes and necessary wiring in 185 houses and 10 flats on Mount Vernon estate. Education Architect, 40 Academy Street.

Dec. 9.—Co. Down. Electrical installation in intermediate school at Kilkeel. Consulting Engineer, A. N. Irens, Bennett Building, 46 Donegall St., Belfast. Deposit £5 5s.

Dec. 10.—Ilkley U.D.C. Installation of mercury lighting (involving 62 columns) in new street lighting scheme. Council's Surveyor, Town Hall. Deposit £3 3s.

Dec. 10.—Manchester. Supply of equipment for 280 pedestrian crossing beacons. City Surveyor, Town Hall. Deposit £1 1s.

Dec. 10. — Newcastle-on-Tyne. Substitution of electric lighting for gas in 930 houses on Walker estate (contract in nine sections). City Architect, 18 Cloth Market.

Dec. 11.—Bootle T.C. Electrical installation at secondary school in Fernhill Rd. Borough Surveyor, Town Hall.

Dec. 11.—Widnes T.C. Supply, erection, and fixing of 1·21 miles of street lighting to Group A. Borough Engineer and Surveyor, Town Hall. (See Nov. 20 issue.)

Dec. 12.—Cornwall. Supply of equipment (approx. 18 units) for lighting zebra crossing beacons. Clerk of County Council, County Hall, Truro.

Dec. 12.—Gainsborough U.D.C. Supply of six assemblies for lighting pedestrian crossings. Engineer and Surveyor, Council Offices, Lord Street.

Dec. 12.—Heston and Isleworth T.C. Supply and installation of equipment for lighting 18 pedestrian crossings. Borough Engineer and Surveyor, 88 Lampton Rd., Hounslow.

Dec. 12.—Malden and Coombe T.C. Supply and erection of (a) 68 H.P.M.V. lamps on either ordinary or prestressed concrete columns; and (b) 74 sodium lamps on either ordinary or prestressed concrete columns, for Street lighting in Coombe and Traps Lanes. John Apse, Borough Engineer, Municipal Offices, New Malden. (See Nov. 27 issue.)

Dec. 12.—Sheffield. Electrical installation at Firs Hill school. W. Geo. Davies, City Architect, Town Hall. Deposit £2.

Dec. 13.—Edinburgh. Supply and installation of electric lift at Longmore Hospital. Ross, Barker and Wallace, 27 Rutland Square.

Dec. 13.—Spenborough U.D.C. Supply of equipment for illumination of 11 pedestrian crossings. J. Wallbank, engineer and surveyor, Spenborough Town Hall, Cleckheaton.

Dec. 15.—Northwich (Ches.) U.D.C. Installation of power points in 71 houses on various estates. Housing Manager, Brunner Central Library, Wilton Street.

Dec. 15.—Wrexham R.D.C. Wiring for light and power in 50 houses and six bungalows at Cefn, and 10 houses at Llangollen. D. Edwards, engineer and surveyor, Imperial Buildings, Regent St. Deposit £2 2s.

Dec. 16.—Bromley T.C. Improvement of street lighting along 1¼ miles of London Rd., High St., and Masons Hill. Applications to Borough Engineer, Municipal Offices, by Dec. 2. Deposit £2 2s. (See Nov. 20 issue.)

Dec. 17.—Northern Ireland. Repairs to electrical installation at Ulster Hospital for children and women. J. R. W. Murland, consulting engineer, 13 Wellington Place, Belfast. Deposit £2 2s.

Dec. 18.—Luton T.C. Electrical installations in 48 flats on Farley Hill estate. Borough Engineer, Town Hall. Deposit £2 2s.

Dec. 18.—Sowerby Bridge U.D.C. Electrical work in 26 dwellings on Kershaw site. Architect and Surveyor, Beech Royd, Beech Rd. Deposit £1 1s.

Dec. 18.—Brighouse T.C. Supply and erection of 33 concrete columns, lanterns and tungsten lamps in Class B on Field Lane

estate, Rastrick. Borough Engineer, Commercial St. Deposit £1.

Dec. 19.—Neath T.C. Provision and erection of electric flashing units and globes for 17 pedestrian crossings, including cable connections. Borough Engineer's Office. Gwyn Hall. Deposit £2 2s. (Advertised in this issue.)

Dec. 20.—Blackpool T.C. Supply of a thousand 200/250 V synchronous motor type switches, 10/20 A with solar dial. Illuminations and Public Street Lighting Officer, Electrical Services Dept., Rigby Rd. East. (Advertised in this issue.)

Dec. 22.—Manchester. Electrical installation in shops, maisonnettes, etc., at Brooklands S.E. sub-centre, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (Advertised in this issue.)

Dec. 23.—Burton-on-Trent T.C. Street lighting works, comprising 34 fluorescent lanterns on concrete columns, along four streets. Borough Surveyor, Town Hall. (Advertised in this issue.)

Dec. 27.—St. Neots U.D.C. Installation of electricity of 36 houses in Potton Rd. Surveyor to Council, Council Offices, Huntingdon Street.

Jan. 2.—Belfast. Supply and erection of feed water equipment at Victoria power station. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. Also supply of sundry materials for stores, including switchgear, cookers, street lighting units, cables, etc. Electricity Dept., East Bridge St., Belfast. Deposit 10s. (Advertised in this issue.)

Jan. 10.—Dagenham T.C. List of supplies for year beginning April 1 next includes electrical lamps and supplies. Borough Engineer and Surveyor, Civic Centre.

OVERSEAS

Details of items marked may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Dec. 18.—Uruguay. Supply of considerable quantities of fluorescent lighting tubes, fittings and accessories for 220 V 50 c/s supply. Administracion Nacional de Combustibles, Alcohol y Portland, Montevideo. B.o.T. (Ref.: CRE 38821/52)*.

Dec. 25.—India. Directorate General of Supplies and Disposals, Shahjahan Rd., New Delhi, require a crucible tilting furnace, 500 lbs capacity, oil-fired, with electric blower, to suit 400 V, 3-phase, 50 c/s a.c. supply.

Jan. 1.—South Africa. Supply and erection of airfield control radio telephone systems in V.H.F. and H.F. bands. Union Tender and Supplies Board, 271 Visagie St., P.O. Box 371, Pretoria.

Jan. 7.—Uruguay. Supply of a total of 16,300 metres of underground armoured cable, tension of 15 kV and 30 kV, for Usinas Electricas y Telefonos del Estado. B.o.T. (Ref.: CRE 38630/52).*

Jan. 9.—Uruguay. Usinas Electricas y Telefonos del Estado requires supply of 2,511,000 metres Hackethal type copper wire and cable and 41,500 metres of conductors with plastic insulation, to various specifications. B.o.T. (Ref.: CRE 39762/52).*

Jan. 20.—New Zealand. Supply of 100 miles of p.v.c. insulated three-wire (internal wiring) cable. Director General (Stores Div.), G.P.O., Wellington.

Feb. 12.—South Africa. Union Tender and Supplies Board requires supply of automatic high-speed telegraph apparatus (five unit code) for South African Air Force. It comprises page printer, sending-receiving typing reperforator, transmitter distributor and accessories. Board is at 271 Visagie St., P.O. Box 371, Pretoria.

CONTRACTS PLACED

B.E.A. Cables and accessories at Rye House, British Insulated Callender's Cables Ltd.; low-pressure piping equipment at Tilbury, Stewarts and Lloyds Ltd.; circulating water valves at Castle Donington, J. Blakeborough and Sons Ltd., and circulating water pumps at same, Worthington-Simpson Ltd.; four cooling towers at Ince, Film Cooling Towers (1925) Ltd.; 33 kV switchgear at Dolgarrog, Ferguson Pailin Ltd.; six boiler feed pumps at Wakefield, Mather and Platt Ltd.; high-pressure pipework and valves at Skelton Grange, Aiton and Co. Ltd.; ash and dust handling plant at Stella North, Babcock and Wilcox Ltd.; ash and dust handling plant at Stella South, Babcock and Wilcox Ltd.; one 20,000 kW turbo-generator and feed heating plants at York, Brush Electrical Engineering Co. Ltd.; ash and dust handling plant at Roosecote, B.V.C. Industrial Constructions Ltd.; auxiliary switchgear at Clyde's Mill, A. Reyrolle and Co. Ltd.; 132 kV 2,500 MVA switchgear at Daventry substation, General Electric Co. Ltd.; 275 kV twin 0·4 sq in overhead line, Slough (now Denham)-Elstree, Watsham's Ltd.; 132 kV overhead line, Stony Stratford-Bedford, Watsham's Ltd., and 132 kV overhead line, Koadby-Creyke Beck, Riley and Neate Ltd.

Your Queries Answered

"Gecko" coffee percolators, repairers of? M.B.—Islington Metal and Plating Works Ltd., Torrens Works, Torrens St., E.C.1. (24495)

Various shaped, interchangeable bit soldering iron suitable for both 110 and 250 V, makers of? J.M.—W. T. Henleys Telegraph Works Co. Ltd., 51/53 Hatton Garden, E.C.1; Browning's Electric Ltd., Boleyn Castle, Green St., E.13. (24509)

"Tom Tit" non-electric kettles, makers of? S.B.—Hague and McKenzie Ltd., Pyramid Works, Sloane St., Birmingham 1. (24488)

"Wootton" lanterns, makers of? T.E.—S. Smith and Sons (England) Ltd., Cricklewood Works, N.W.2. (24516)

"Magilec" toasters, makers of? L.B.—Stormlight Electrical Co. Ltd., 160/162 Mile End Rd., London E.1. (24530)

"Chromeray" fire-lighting poker, makers of? A.W.—Sarum Electric Ltd., 68 Brown St., Salisbury (24538)

"Nebro" enlarging lamps, suppliers of? E.F.—Neville Brown and Co., 77 Newman St., London W.1. (24523)

The above are selected from questions we have answered this week. If you have a query, send it to us.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Cox and Lockyer, Ltd., 19 Meadow St., Weston-super-Mare. Manufacturers of and dealers in electrical and mechanical apparatus, and in particular wireless and television sets, etc. Cap.: £3,000. Dirs.: D. X. Cox and S. W. J. Lockyer.

Fridge Refrigeration Co., Ltd., 373 Lewisham High Rd., S.E.13. Manufacturers of and dealers in refrigeration and cold storage machinery, etc. Cap.: £1,500. Dirs.: W. E. Chapman, Mrs. A. E. Chapman and B. W. R. Chapman and R. E. J. Chapman.

James Quality Recording Co., Ltd., 9 Adam St., W.C.2. Manufacturers and distributors of gramophone and other records; wireless and electrical engineers and contractors, etc. Cap.: £100. Dirs.: E. J. Radford and Mabel L. Radford.

King and Norris, Ltd. To apply for or acquire any patents, and carry on business of mechanical engineers, manufacturers of electrical, surgical, hospital, laboratory and scientific furniture and equipment, etc. Cap.: £200. Dirs.: To be appointed by subs. Subs.: D. A. Povey and T. B. Jenkins, 62-4 Moorgate, E.C.2.

Kitchin Constructions Ltd., 11 Camden High St., N.W.1. Manufacturing, mechanical, electrical, constructional, consulting and general engineers, etc. Cap.: £1,000. Dirs.: H. C. Kitchen, H. J. Nunn and Christina Magnussen.

J. Arthur Moss (Electrical), Ltd. Electrical installation contractors, etc. Cap.: £1,000. Dirs.: J. A. Moss and Mrs. M. A. H. Moss, 38 Greencroft Rd., Heston, Middx.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Dansette. 711,084. Class 9. Radiogramophones, etc. J. and A. Margolin, Ltd., Plus-a-Gram House, 112-116 Old St., E.C.1.

Nufax. 709,896. Class 9. Transmitting and recording apparatus, etc. Muirhead and Co., Ltd., Croydon Rd., Elmers End, Beckenham, Kent.

Wefco. 693,208. Class 11. Electric hand lamps and torches. Watts, Fincham (1932) Ltd., 9 St. Helen's Place, E.C.3.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	94 10 0	£112 0 0
,, ,, ,, "English" quality ...	96 0 0	
Tin (99·99·76%) ... ...(Cash)	953-954	—
,, (3 months)	946-946½	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	110 0 0	£100 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.) ...	53 0 0	—
Mild Steel Tape (0.04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Accessories Electrical Supplies (Wholesale) Ltd. Petition for winding-up presented and directed to be heard at Royal Courts of Justice, London, on Dec. 15. Interested persons should communicate with Tringhams, 53 Doughty St., John St., W.C.1.

Bloor Industries Ltd., Newcastle, Staffs. Meetings of creditors and contributories will take place at North Stafford Hotel, Stoke, on Dec. 11, at 11 a.m. and 11.30 a.m. respectively.

Claytelec, Ltd., London, N.5. Last day for receiving proofs in respect of intended dividends, Dec. 10. Liquidator is Frank M. Collins, Official Receiver, Inveresk House, Strand, W.C.2.

Electrical Engineering and Advice Bureau Ltd. Liquidator, H. P. Naunton, Inveresk House, Strand, London, released as from Sept. 30.

Keen Refrigeration Co., Ltd. Resolution for voluntary winding-up passed at meeting on Nov. 19 when David Morgan, Inc. Acc., 100 Park St., W.1, was appointed liquidator.

Medcalfe and Co. Ltd. First and final dividends of 2s. 7·2d. in £ payable at 59 New Cavendish St., London W.1, on Dec. 12.

John Raymond (Electrical) Ltd., Cheltenham. Last day for receiving proofs in respect of intended dividends, Dec. 19. Liquidator is G. W. Sisman, 26 Baldwin St., Bristol.

G. E. Stephens (Grays) Ltd. Meetings of creditors and contributories will be held at Inveresk House, Strand, London, on Dec. 10, at 11.30 a.m. and 12 noon respectively.

BANKRUPTCY ACTS

Public Examinations

Aylesbury. Robert Joliffe, manufacturer of electric vermin traps, of 31 Buckingham Rd. First meeting, tomorrow (Friday), at Central Buildings, Matthew Parker St., Westminster, at 11 a.m., and public examination will be at County Hall, Aylesbury, on Jan. 21, at 2.30 p.m.

Birkenhead. Alfred R. Williams, electrical engineer, trading at 33A Beech Rd. Public examination at Court House, Pilgrim St., on Jan. 21, at 11 a.m. First meeting was held yesterday (Wednesday).

London. Sydney S. Chapman, trading as S. Chapman and Co., electrical agent at 103 Endsleigh Court. Public examination will be at Bankruptcy Buildings, Carey St., W.C.2, on Jan. 22, at 11 a.m. First meeting took place yesterday (Wednesday).

Release of Trustee

Birmingham. Henry Walton, electrical engineer trading as Universal Motor Repair Co. Ltd., at 200 Birchfield Rd., Perry Bar, Birmingham. Trustee was R. K. Clarke, Somerset House, 37 Temple St., Birmingham.

Dividends

Chelmsford. Bertie A. Murton, electrician, trading at 54 The Green, Writtle. First and final dividends of 1s. 1½d. in £ payable at Official Receivers' Office, 3 Central Buildings, Matthew Parker St., Westminster, on Dec. 12.

Intended Dividends

Colchester. Clarence L. Philpott, radio and electrical dealer, of 55 High St., Walton-on-Naze. Last day for receiving proofs, Dec. 11. Trustee is A. W. Hunter, Walter House, 418-422 Strand, London, W.C.2.

Salisbury. John S. Anderson, trading as Electronic Services at Nearavon, Salisbury St., Fordingbridge. Last day for receiving proofs, Dec. 9. Trustee is A. H. Brown, The Square, Fordingbridge.

BUSINESS PROSPECTS

Airdrie T.C. Plans in hand for erection of 415 houses, shops, church, schools, etc., on Burnfoot site.

Barnstaple T.C. Approval sought for erection of 99 dwellings on Crosslands estate.

Batley T.C. Plans in hand for construction of shops on Staincliffe estate. Approval sought.

Birmingham. Shops are to be built on Kents Moat, Lea Hall, Tile Cross, Brandwood Park, Turves Green and Rednal House estates.

Bolton T.C. Erection of 58 flats and bungalows on Oldhams estate. Housing Director, Town Hall.

Brentwood U.D.C. Block of shops to be built on Three Arch Bridge estate.

Brierley Hill U.D.C. Construction of 91 dwellings on Swan Lane estate. Council's Architect, J. R. Moore, Council Offices, Moor Street.

Brighton T.C. Tenders likely to be invited soon for erection of 62 dwellings on Craven Vale estate and 76 on S. Woodingdean estate.

Brownhills (Staffs) U.D.C. Erection of 48 houses on Warreners Arms site. Council's Architects, Jennings, Home and Lynch, 3 Church St., Brierley Hill.

Chester. Construction of shopping centre on Blacon estate. City Engineer and Surveyor, Municipal Offices, 43 Northgate Street.

Colwyn Bay T.C. Construction of 42 houses on Glyn estate. S. Powell, Somerset House, Princes Drive.

Consett (Dur.) U.D.C. Layout plans approved for erection of 140 houses in Gloucester Rd. Architect is J. J. Eltringham, Derwent St., Blackhill.

Coseley U.D.C. Erection of 58 houses, eight bungalows and four shops on Batmans Hill site. J. C. Roper, clerk of council, Council House.

Daventry. Kneller Instrument and Tools Ltd., Rugby, propose to build a factory off London Rd. and near B.B.C. station.

Dublin. Erection of 210 houses in Ballyfernot area. Contracts for further 202 houses may also be placed as result of tenders received. City Treasurer, Exchange Buildings, Lord Edward Street.

Dundee. Approval given to erection of 200 houses at St. Mary's and 150 on Douglas and Angus estate.

Ebbw Vale U.D.C. Erection of 166 houses on Hilltop site. Architect to Council, Council Offices, The Walk.

Fife. British Railways will start work shortly on construction of marshalling yard at Thornton. Estimated cost, £750,000.

Glasgow. Twisteel Reinforcement Ltd., London, are to build small factory in Pinkston Rd. Plans in early stages yet.

Godalming. Sketch plans approved for first instalment of Broadwater secondary school. Estimated cost £39,182.

Grimsby T.C. Phillips Son and Norfolk of Nottingham will probably be appointed as consulting engineers for heating and electrical services at new police headquarters and court.

Guildford. Approval received for an instalment of Park Barn secondary school, estimated to cost £67,265.

Halifax T.C. Erection of 14, eight and 12 bungalows under separate contracts. Geoffrey Holden, Borough Engineer, Crossley Street.

Harrogate T.C. Building of 350 houses is planned for 1953.

Haverfordwest T.C. Approval granted for erection of 48 flats, 20 bungalows and 134 houses on City Road estate.

Limerick. School of commerce is to be built in O'Connell Ave. at estimated cost of £40,000.

Melton Mowbray T.C. Erection of 120 houses on Dorothy Ave. site. P. B. Sutton, engineer and surveyor, Egerton Lodge.

Midhurst (Sussex) R.D.C. Thirty houses to be built at Fernhurst, 12 each at Rogate and Trotton, and 10 at Elsted and Spring.

Morley T.C. Erection of 32 houses in Bruntcliffe Lane. Housing Director, M. H. Brook, National Provincial Bank Chambers, Queen Street.

Portsmouth. Proposals approved for erection of 420 houses on Barncroft estate, Leigh Park.

Stoke-on-Trent. It is proposed to build 46 houses at Trent Vale, 68 at Bucknall and another 22 at Trent Vale.

Warlingham (Surrey). Sketch plans approved for £179,155 secondary school.

TRADE NOTES

New Branch.—Enfield Cables Ltd. have opened a new branch at 9/9A Bank Street, Aberdeen (Tel.: Aberdeen 20319), which is under the care of Mr. J. T. F. Lippett.

Reorganisation. A new Domestic Equipment section has been formed within the Rubery, Owen organisation. Easiclene Porcelain-Enamel (1938) Ltd. has taken over the marketing of "Castra" electric washing machines and "Gasel" absorption type refrigerators, and all products will be marketed under the trade name "Easiclene." Coverage will be directed by: Midlands and Northern areas sales manager, Mr. R. C. Brewer, at Darlaston; London and Southern areas sales manager, Mr. Friedman, at Kent House, Market Place, Oxford Circus, W.1; and export enquiries by Mr. J. M. Garrett, Export Dept., at that address.

Production. Following the fire in June at the Bromford Lane Works of the Electrical Power Engineering Co. (B'ham) Ltd., the company is rapidly returning to normal production. The smaller works in Mackadown Lane has been organised to give 9/11 weeks despatch for a.c. flameproof squirrel cage motors and 4/6 months for most d.c. and R.I. machines. By the end of the year it is hoped to cut these times.

Expansion. Mullard Equipment Ltd. have acquired another factory in Garratt Lane, Wandsworth, S.W.18.

Changes of Address. Electromotive Supplies and Services Co., Ltd. have moved to 115a Red Lion Road, Tolworth, Surbiton, Surrey. The telephone No. remains Elmbridge 7093.

The London office of the Tudor Accumulator Co., Ltd. has moved to 137 Victoria Street, S.W.1. · Tel.: Tate Gallery 0307.

The London office of Pritchett and Gold and E.P.S. Co., Ltd. is now at 137 Victoria Street, S.W.1. Tel.: Tate Gallery 9212.

New Phone No. The London telephone No. of G. P. Dennis Ltd. is now Whitehall 6425/6.

Copper Wire.—Copper enamelled wire, filament type of less than 0·15 mm. dia. may be imported into Argentina free of duty if for use exclusively in the production of motors and dynamos, under a Resolution just published in Buenos Aires.

MEETINGS TO NOTE

THURSDAY, DEC. 4

E.P.E.A. (Merseyside Tech. Group).—"Thermal Problems in Cable Design, Manufacture and Operation." J. Temple Hazel. Elect. Showroom, Whitechapel, Liverpool, 7 p.m.

INCORP. PLANT ENGRS. (Peterborough Branch).—"Modern Dairy Plant." C. H. Maguire. Gas Board, Church St., 7.30 p.m.

I.E.E. (London).—"Overhead Equipment for d.c. Railway Electrification." A. J. Crompton and G. A. Wallace. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Nottingham Centre).—"Street Lighting Practice." J. Woodhouse. Elect. Board, Smithy Row, 6 p.m.

I.E.S. (Exeter Group).—"Architect's Approach to Artificial Illumination." R. G. Cox. Providence Hall, Northernhay St., 7 p.m.

INSTN. OF ENGRNG. INSPECTION (London).—"Gas Turbine: Present Position and Prospects." A. W. Pope. Royal Soc. of Arts, John Adam St., W.C.1, 6 p.m.

FRIDAY, DEC. 5

I.E.S. (Bath and Bristol Centre).—"Architect's Approach to Artificial Illumination." R. G. Cox. Elect. Board, Old Bridge, Bath, 7 p.m.

I.E.S. (Huddersfield Group).—"Lighting Ideas for the Home." Miss M. D. Wardlaw. Elect. Showroom, Market St., 7.15 p.m.

I.E.E. (E. Midland Centre).—"Diesel Electric Locomotives for Industrial Haulage." F. D. Lester. Leicester College of Technology, 6.30 p.m.

I.E.E. (Rugby sub-centre).—Faraday lecture on "Light from Dark Ages or Evolution of Electricity Supply." A. R. Cooper. Temple Speech Room, 6.30 p.m.

MONDAY, DEC. 8

A.S.E.E. (N.W. London Branch).—"Maintenance of Electric Lifts." Prince of Wales Hotel, Kingsbury, 8 p.m.

LEICESTER ELECTRICAL SOC.—"Fractional h.p. Motors." R. V. M. Shinnie. Elect. Offices, Charles St., 7 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS. (Liverpool Branch).—"Dual Function of Ventilation and Meaning of Air Conditioning." A. Leslie Longworth. Radiant House, Bold St., 6.30 p.m.

I.E.E. (London).—Discussion on "Maintenance of Electrical Equipment." R. H. Cobbold. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Leeds Centre).—Student Members' Night. Lighting Service Bureau, Aire St., 6.15 p.m.

I.E.S. (Sheffield Centre).—"Lighting in Crime Detection." C. Harold Edlin. University, Western Bank, 6.30 p.m.

I.E.E. (E. Midland Centre).—Faraday lecture on "Light from the Dark Ages or the Evolution of Electricity Supply." A. R. Cooper. Albert Hall, Nottingham, 6.30 p.m.

I.E.E. (Merseyside and N. Wales Centre).—"Electrolytic Analogue in Design of H.V. Power Transformers," D. McDonald; "Accurate Mapping of Electric Fields with Electrolytic Tank," K. F. Sander and J. G. Yates. Town Hall, Chester, 6.30 p.m.

I.E.E. (N.E. Centre).—"Inhibited Transformer Oil," W. R. Stoker and C. N. Thompson; and "Stability of Oil in Transformers," P. W. L. Gosling and L. H. Welch. Neville Hall, Westgate St., Newcastle, 6.15 p.m.

I.E.E. (S. Midland Supply and Utilisation Group).—"Transients in Electric Mine Winders and Effects on Rope Stresses." T. H. Petch. Imperial Hotel, Birmingham, 6 p.m.

I.E.E. (N. Staffs sub-centre).—"Economics of L.V. Electricity Supplies to new Housing Estates." F. G. Copland. Electricity Showrooms, Stoke, 7 p.m.

I.E.E. (Western Centre).—"Domestic Electrical Installations: Some Safety Aspects." H. W. Swann. Elect. Offices, Colston Ave. Bristol, 6 p.m.

A.S.E.E. (Central London Branch).—"Fluid Couplings for Electric Motor Drives." E. C. Farrer. St. Ermin's Hotel, Caxton St., S.W.1, 6.45 p.m.

TUESDAY, DEC. 9

INCORP. PLANT ENGRS. (Glasgow Branch).—"Power Factor Correction." Hugh Ferguson. 351 Sauchiehall St., 7 p.m.

I.E.E. (London Students Section).—Chairman's address on "Protection of Running Buses," by B. L. A. Ellings. George Hotel, Reading.

I.E.E. (London Measurements and Supply Sections).—"Voltage Transformers and Current Transformers Associated with Switchgear." W. Gray and A. Wright. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (London).—"Visual Fatigue." H. C. Weston. 2 Savoy Hill, W.C.2, 6 p.m.

I.E.S. (Stoke Group).—"Colour in Industry." J. H. Nelson. Elect. Board, Kingsway, 6 p.m.

I.E.E. (Cambridge Radio Group).—"TV Camera Tubes." R. Theile. Cavendish Laboratory, 8.15 p.m.

I.E.E. (N. Midland Centre).—"Post-Graduate Activities in Electrical Engineering." W. J. Gibbs, D. Edmundson, R. G. A. Dimmick and G. S. C. Lucas. B.E.A. Offices, Whitehall Rd., Leeds, 6.30 p.m.

I.E.E. (N.W. Supply Group).—"275 kV Developments on British Grid System." D. P. Sayers, J. S. Forrest and F. J. Lane. Engineers' Club, Albert Sq., Manchester, 6.15 p.m.

I.E.E. (N. Ireland Centre).—"Economic Plant Sizes and Boiler-Set Groupings on the British Grid." B. Donkin and P. H. Margen. Presbyterian Hostel, Howard St., Belfast, 6.45 p.m.

A.S.E.E. (Bolton Branch).—"H.R.C. Fusegear." E. Jacks. Balmoral Hotel, Bradshawgate, 7.30 p.m.

WEDNESDAY, DEC. 10

PURCHASING OFFICERS ASSOC. (Tyneside Branch).—"Nature of Plastics." Film. Crown Hotel, Newcastle, 7 p.m.

INCORP. PLANT ENGRS. (E. Midlands Branch).—"Diesel Electric Locomotive." F. D. Lester. Welbeck Hotel, Nottingham, 7 p.m.

I.E.E. (London Educ. Circle).—Discussion on "B.B.C. School, Evesham," and "G.P.O. School, Stone." K. R. Sturley and H. R. Harbottle. Savoy Place, W.C.2, 6 p.m.

BRITISH INSTN. OF RADIO ENGRS. (London).—"Production of TV Receivers." Frank Allen. School of Hygiene, Keppel St., London W.C.1, 6.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.E. Section).—"Radio and Electronics Industry in India." G. D. Clifford. Neville Hall, Westgate Rd., Newcastle, 6 p.m.

I.E.E. (N. Lancs sub-centre).—"Protection of Electric Power Systems." H. Leyburn and C. H. W. Lackey. Harris Inst., Corporation St., Preston, 7 p.m.

I.E.E. (N. Scotland sub-centre).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. Caledonian Hotel, Aberdeen, 7.30 p.m.

I.E.E. (Southern Centre).—"Principles of Colour TV." J. H. Mole. Dorset Tech. College, Weymouth, 6.30 p.m.

A.S.E.E. (Bradford Branch).—"Miniature Circuit-Breakers." Dorman Smith. Midland Hotel, 7.30 p.m.

A.S.E.E. (Leeds Branch).—"Radio Active Isotopes in Service of Medicine." Dr. F. W. Spiers. City Museum, 7.30 p.m.

A.S.E.E. (Preston Branch).—"Pyrotenax Cables." R. B. Barritt. Bull and Royal Hotel, 7.45 p.m.

THURSDAY, DEC. 11

INCORP. PLANT ENGRS. (Newcastle-on-Tyne Branch).—"Pile Driving." R. Stelfox. Roadway House, Oxford St., 7.30 p.m.

I.E.E. (London Utilisation Section).—"Electrical Installation in Festival Hall." J. G. Hunter. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Manchester Centre).—"Investigation into Stroboscopic Effect." E. Smith. Joint meeting with A.S.E.E. N.W. Elect. Board, Town Hall Extension, 6 p.m.

I.E.E. (N. Scotland sub-centre).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. Royal Hotel, Dundee, 7 p.m.

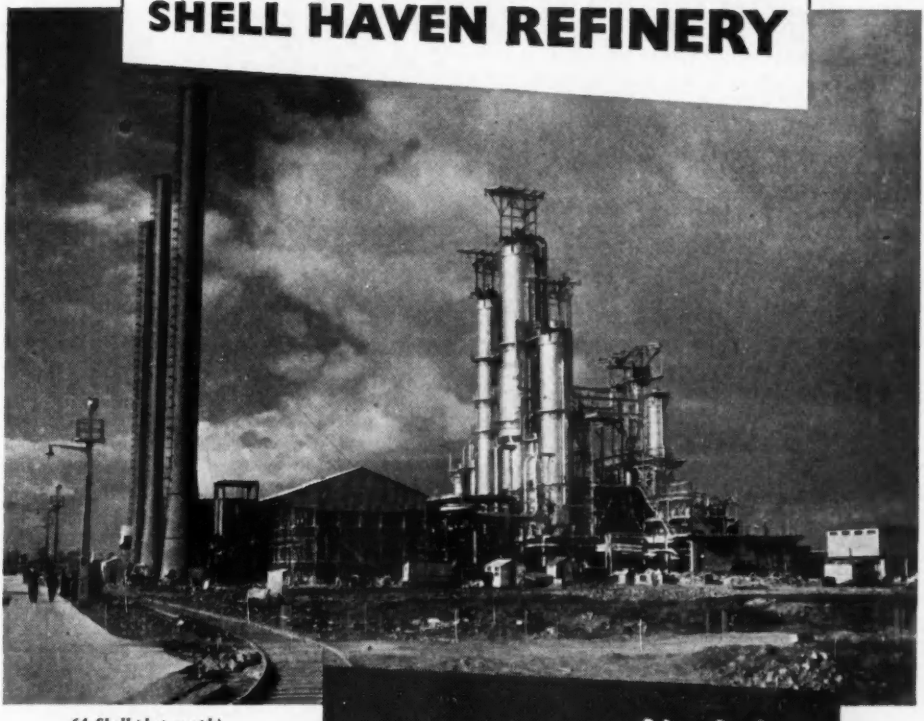
I.E.E. (Swansea sub-centre).—"Standardisation and Simplification in Electrical Industry." J. T. Moore. Central Public Library, 6 p.m.

A.S.E.E. (Kent Branch).—"Radar Aids to Navigation." Gp. Capt. E. Fennessy. Royal Star Hotel, Maidstone, 8 p.m.

EXHIBITION DIARY

Smithfield Show and Agric. Machinery Exbn. opens at Olympia, London, on Dec. 8, continuing until Dec. 12.

Rubber cables for
SHELL HAVEN REFINERY



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BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON, E.C.1

Load fluctuations — power line failures —

may result in unnecessary and frequent lifting of the Drum and Superheater Safety Valves.

Under such conditions, the Dewrance-Consolidated Electromatic Relief Valve will relieve excess pressure in the boiler, eliminating the necessity of any of the normal complement of Safety Valves operating—except in extreme emergency. Wear and maintenance of these Valves is therefore reduced and costly shut-downs avoided.

The valve-head is held to its seat by **full boiler pressure and not by differential pressure** as in the conventional Safety Valve, it therefore cannot simmer or chatter. The Valve is wide open or closed tight with its action governed by positive electrical control.

The Dewrance-Consolidated Electromatic Relief Valve is a full bore Valve with a capacity in excess of the conventional Safety Valve, and can be set to relieve pressure accurately at any pre-determined pressure with a blow-down of 1%.

A large number of these Valves are in service in Power Stations in this country and abroad.

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

BOROUGH OF NEATH

TO ELECTRICAL AND OTHER CONTRACTORS
LIGHTING OF PEDESTRIAN CROSSINGS

TENDERS are invited for the PROVISION AND ERECTION of electric flashing units and beacon globes to 17 pedestrian crossings in the borough of Neath, including underground cable connections.

Condition of contract and specification can be obtained and plan seen at the Borough Engineer's Office, Gwyn Hall, Neath, on payment of a deposit of £2/2/-, returnable on the receipt of a bona fide tender not afterwards withdrawn and the return of all documents.

Tenders in a sealed envelope, bearing no mark which will identify the sender and marked "Pedestrian Crossing Lighting," are to be received by me not later than 12 noon on Friday December 19, 1952.

A. E. I. CURTIS,
Town Clerk.
(C 47)

ST. NEOTS URBAN DISTRICT COUNCIL

POTTON ROAD HOUSES—SUPPLY OF ELECTRICITY

TENDERS are invited for the INSTALLATION of electricity at the above 36 Council houses, comprising lighting, cooking and plug circuits.

Specification of the work to be carried out can be obtained from the Surveyor to the Council at the undermentioned address, and tenders in sealed envelopes endorsed "Potton Road Electricity," must be forwarded to the undersigned not later than Saturday, December 27 next.

The Council do not bind themselves to accept the lowest or any tender.

L. HENDERSON,
Clerk of the Council.

Council Offices,
Huntingdon Street,
St. Neots,
Hunts.
November 27, 1952. (C 68)

COUNTY BOROUGH OF BLACKPOOL

TENDERS are invited by the Corporation for the supply and delivery of:—

1,000 200/250 V synchronous motor-type switches, 10/20 amp capacity with Solar dial "on" and "off" and an additional "off" about midnight.

The Corporation do not bind themselves to accept the lowest or any tender.

Forms of tender and general conditions may be obtained from the Illuminations and Public Street Lighting Officer, Electrical Services Department, Rigby Road East, Blackpool. Tenders are to be addressed to the undersigned and delivered in a plain sealed envelope endorsed "Time Switches," to reach him not later than 10 a.m. on Saturday, December 20, 1952.

TREVOR T. JONES,
Town Clerk.
(C 103)

CITY OF MANCHESTER

THE ESTATES MANAGEMENT COMMITTEE invite tenders for ELECTRICAL INSTALLATION required at shops, maisonettes and garages at Brooklands South-east Sub-Centre, Wythenshawe. Specification, drawings and tender form may be obtained from the City Architect, Town Hall. Deposit £1 1s. 0d. (returnable). Tenders, sealed in endorsed envelopes, must be delivered before 10 a.m. on Tuesday, December 22, 1952.

PHILIP B. DINGLE,
Town Clerk.
November, 1952. (C 65)

CITY OF BELFAST

FEED WATER EQUIPMENT
VICTORIA POWER STATION

TENDERS are invited as under:—

The supply, delivery and erection of five indicating feed water flow meters.

Form of Tender (No. N.1333), conditions and specification, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne, 1, on payment of a deposit of five guineas, which will be refunded provided a bona fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Latest time for receipt of tenders, to be lodged in quadruplicate—4 p.m. on Friday, January 2, 1953.

STORES

The supply of the undermentioned materials:—

Form No.		Form No.	
2.	Transformer oil.	25.	Overhead line materials.
10.	6,600-volt compound filled armourclad switchgear.	26.	Mineral insulated copper covered cables and terminating accessories
11.	Meters, instrument transformers, and ancillary equipment.	27.	Steel conduit and tinned weak back ferrules.
12.	Electricity maximum demand indicators.	29.	Rubber insulated cables and flexible cords.
14.	L.T. fuse units, service cut-outs and accessories.	33.	Nickel iron switch tripping batteries and charging equipment.
16.	Vulcanised bitumen and paper insulated cables and joint boxes.	34.	6,600-volt ring main and switch fuse units.
21.	Electric cookers.	38.	Medium voltage H.R.C. cartridge fuse links.
23.	Street lighting fittings, steel and concrete poles, and ancillary equipment.	39.	Imported red fir wood poles.

NOTE.—Form No. 29 is in respect of materials which shall be supplied to any Department of the Corporation.

Forms of Tender may be obtained at the Electricity Department, East Bridge Street, Belfast, on payment of the sum of ten shillings (non-returnable) for each form. Extra copies of the forms may be obtained at five shillings each (non-returnable). Cheques should be made payable to the Belfast Corporation Electricity Department. All letters, catalogues, drawings, etc., accompanying tenders must be submitted in duplicate.

Latest time for receipt of tenders—4 p.m. on Friday, January 2, 1953.

METERING EQUIPMENT, VICTORIA POWER STATION

The supply, delivery and erection of integrating and summation metering equipment.

Form of Tender (No. N.1291), conditions and specification, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne, 1, on payment of a deposit of five guineas, which will be refunded provided a bona fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Latest time for receipt of tenders, to be lodged in quadruplicate—4 p.m. on Friday, January 16, 1953.

The following conditions apply to the above mentioned tenders: Each tender, in sealed envelope marked "Tender for ....." and endorsed with the name and address of the tenderer, must reach the undersigned not later than the time specified.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.
City Hall, Belfast.
November 28, 1952. (C 102)

COUNTY BOROUGH OF BURTON-UPON-TRENT

FLUORESCENT LIGHTING—34 LANTERNS ON CONCRETE COLUMNS—GUILD STREET, HORNINGLOW STREET, BRIDGE STREET AND BURTON BRIDGE

THE Corporation invite Tenders for the carrying out of the above-mentioned street lighting works within the County Borough of Burton-upon-Trent.

Conditions of contract and a plan showing the proposed siting of the lamps can be seen, and specification and form of tender may be obtained, on application to the Borough Surveyor, Town Hall, Burton-upon-Trent.

Sealed tenders, in envelopes to be provided, must be delivered to the undersigned not later than 10 a.m. on Tuesday, December 23, 1952.

The acceptance of a tender will be subject to the Standing Orders of the Council with respect to Contracts (a copy of which may be obtained on application to the Borough Surveyor) and to the execution of a formal contract.

The Council do not bind themselves to accept the lowest or any tender.

H. BAILEY CHAPMAN,
Town Clerk.

Town Hall,
Burton-upon-Trent.
December 5, 1952. (C 101)

APPOINTMENTS VACANT

Employment of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

COUNTY BOROUGH OF BARNSLEY

Borough Engineer and Surveyor's Department

APPOINTMENT OF STREET LIGHTING ASSISTANT

APPLICATIONS are invited for the post of Street Lighting Assistant at a salary in accordance with A.P.T. Grade VII, commencing at £710 per annum.

Applicants should be suitably qualified and should have had extensive experience in the design and installation of new street lighting schemes and in the supervision and control of maintenance work. It will be an advantage to have had experience in the preparation of schemes and estimates for electrical installations in buildings under the control of a Local Authority.

The appointment will be subject to the Scheme of Conditions of Service for A.P.T.C. Services, to the General Conditions of Service within the Corporation as varied from time to time and to the provisions of the Local Government Superannuation Acts.

The successful candidate will be required to pass a medical examination and the appointment will be subject to one month's notice on either side.

Applications, stating age, present and previous appointments, experience and qualifications, etc., together with the names of three referees, should be addressed to the Borough Engineer and Surveyor, Town Hall, Barnsley, to reach him not later than Tuesday, December 30, 1952.

Canvassing will disqualify and applicants should disclose whether they are related to any member or senior officer of the Council.

A. E. GILFILLAN,
Town Clerk.

Town Hall, Barnsley.
December, 1952. (C 104)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments in the Board's No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham:—

(1) ENGINEERING DRAUGHTSMAN

Salary £433/£567 per annum (N.J.B. Schedule "D", Grade 6). Candidates should be experienced in one or more of the following subjects: building and civil engineering design; engineering drawing; structural steelwork design; overhead line design. Possession of the Higher National Certificate advantageous.

(2) GENERAL ASSISTANT ENGINEER (BUILDINGS)

Salary £522/£573 per annum (N.J.B. Class "J," Grade 13). Applicants should have had experience of design and detail drawing of various architectural and civil engineering works, specification writing, estimating, surveying and levelling, and supervision of site work.

The appointments are superannuable and subject to medical examination.

Application forms obtainable from the Manager, above address; quote reference 89A. Closing date, December 15, 1952. (C 49)

LONDON ELECTRICITY BOARD

SUB-AREA SECTION ENGINEER (CONSTRUCTION)

APPLICATIONS are invited for the above position in the Northern Sub-Area, Aldersgate Street, E.C.1.

Applicants should be Chartered Electrical Engineers with considerable practical experience in the laying and jointing of all types of cable, equipping of transformer chambers and substations and the handling of heavy plant in congested industrial and city districts, together with the organisation and control of labour, ordering of material and equipment and progress records. Experience in the preparation of engineering specifications and supervision of contract work is also required, and applicants should be conversant with modern workshop practice and, although not essential, a knowledge of building construction will be deemed an advantage.

The post is graded under Schedule "A" of the National Joint Board agreement as Class "K," Grade 4, £1,143 per annum, rising to £1,191 per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46/7, New Broad St., London, E.C.2, to be returned completed by December 16, 1952. Please enclose addressed foolscap envelope and quote ref.: V/1533/T. on all correspondence. (C 89)

METROPOLITAN WATER BOARD

APPOINTMENT OF
SENIOR ASSISTANT ENGINEER (ELECTRICAL)

APPLICATIONS are invited from corporate members of the Institution of Electrical Engineers for appointment as a Senior Assistant Engineer (Electrical) on the permanent staff. Salary scale £917 by £54 to £1,133 per annum. Maximum age 45 years.

Applicants must have had experience in the design, arrangement, specifying and the assessment of tenders for high tension sub-stations; high tension motors, generators and control gear up to 3,000 h.p.; low tension motors, generators and control gear; and associated wiring and cable work.

A house is available if required, in a good neighbourhood, at an inclusive rental of £125 p.a.

A form of application may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope quoting reference ("B"). W. S. Chevalier, Clerk of the Board, Offices of the Board, New River Head, Rosebery Avenue, London, E.C.1. (C 40)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement.

ASSISTANT SHIFT CHARGE ENGINEER
Hackney Generating Station

Qualifications to H.N.C. standard. Experience in modern boiler and turbine plant, stoker-fired boilers and e.h.t. switchgear operation. Salary, Schedule "A," Class "F," Grade 9, £637 7s. p.a.

ASSISTANT SHIFT CHARGE ENGINEER
Stepney Generating Station

Qualifications to H.N.C. standard. Experience in modern boiler plant, stoker and P.F. firing and knowledge of e.h.t. switchgear operation. Salary, Schedule "A," Class "F," Grade 9, £637 7s. p.a.

MAINTENANCE ENGINEFR (ELECTRICAL)
Hackney Generating Station

Applicants should have served apprenticeship and have experience in maintenance of equipment in large generating station, including e.h.t. switchgear, motors, starters, lighting and heating. Qualifications to H.N.C. (electrical). Salary, Schedule "A," Class "F," Grade 6, £774 18s. p.a.

GENERAL ASSISTANT ENGINEER (PROGRESS)
Construction Department, Divisional H.Q.

Applicants should have H.N.C. or equivalent and will be required to attend site progress meetings and visit power stations under construction. Practical experience in the construction of modern power stations and preparation of commissioning programmes necessary. Salary, Schedule "C," in Scale "AX8," £526 1s. to £670 19s., rising to ultimate max. £749 14s. p.a.

Applications must be made on the standard form obtainable from Divisional Secretary, British Electricity Authority, London Division, Generation House, Great Portland Street, W.1, and be returned within 14 days of this advertisement. (C 93)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

Lochaber Area

LINESMAN required for Morar district, rate of pay and conditions of service in accordance with N.J.I.C. for electricity supply industry. House available at Mallaig. —Applications, stating age and full particulars of experience, to Area Manager, North of Scotland Hydro-Electric Board, Area Office, Bank Street, Fort William. (C 43)

CENTRAL ELECTRICITY BOARD

FEDERATION OF MALAYA

ELECTRICAL ENGINEER FOR COMMERCIAL WORK (M.29300B)

ASSISTANT POWER STATION SUPERINTENDENT (M.28769B)

OPERATION AND EFFICIENCY ENGINEER (M.28770B) required by the Central Electricity Board, Federation of Malaya. Option of appointment, either (a) on agreement for three years in the first instance leading, subject to satisfactory service, to an offer of permanent employment on the pensionable establishment, with opportunity of terminating appointment at the end of the first year's service if so desired; or (b) on contract for three years with a gratuity on satisfactory completion of final service at the rate of £50 or £70 for each completed period of three months' service according to salary. Allowances, additional to those mentioned below, ranging between £210 and £630 a year, are payable to married men according to salary and dependants. Free passages. Liberal leave on full salary.

Electrical Engineer for Commercial Work. Salary (including allowances) payable in local currency, equivalent at present Government rate of exchange to £1,216 rising to £2,100 a year. Commencing salary according to qualifications, war service and experience. Candidates must have had not less than five years' experience on the commercial side of a large electricity undertaking, involving costing and estimating of major electrical works, and should preferably be Corporate Members or Graduates of the Institution of Electrical Engineers or possess degrees or other qualifications carrying exemption from the Institution Graduateship Examinations. Those who are not so qualified would be eligible for salary on a lower scale equivalent to £1,197 rising to £1,862 a year (including allowances).

Assistant Power Station Superintendent. Salary (including allowances) payable in local currency, equivalent at present Government rate of exchange to £1,904, rising to £2,100 a year. Candidates must have wide experience of station maintenance and operation and preferably have held a similar position in a steam power station of not less than 80 MW capacity, or as a charge engineer for at least five years in a station of not less than 120 MW capacity.

Operation and Efficiency Engineer. Salary (including allowances) payable in local currency equivalent at present Government rate of exchange to £1,687 rising to £2,100 a year. Candidates must have had good power station experience, including some years as a charge engineer in a modern steam station, and have a knowledge of the principles of combustion, thermal cycles and heat balances, system control and the economics of operation. Candidates should preferably be Corporate Members or Graduates of the Institutions of Electrical or Mechanical Engineers or hold an equivalent qualification. Those who are not so qualified would be eligible for salary on a lower scale, equivalent to £1,673 rising to £1,862 a year.

Apply at once, by letter, stating age, full names in block letters and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter the reference number against the appointment for which application is made. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 92)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN required in the Engineering Department at the Headquarters of the Board, Electricity House, Love Lane, Liverpool 3. Salary within the range £433 to £567 per annum, rising by annual increments (N.J.B. Schedule "D," Grade 6).

Applicants should preferably have experience in building work as applied to industrial and commercial premises and/or reinforced concrete structures and foundations, and should have reached Ordinary National Certificate standard.

The appointment is superannuable and subject to medical examination.

Application forms obtainable from the Establishments Officer (Ref. 90A), above address. Closing date: December 15, 1952. (C 71)

SOUTH EASTERN ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER
Dover District.

SALARY £433 p.a., under N.J.B. D.13. Superannuable. Applicants should have had sound training in electrical engineering and experience in construction, operation and maintenance of underground and overhead systems to 11 kV.

Applications, giving 2 referees, must reach R. G. Widgery, A.M.I.E.E., District Manager, SEEBoard, Ladywell, Dover, by December 10, 1952.

A. L. BURNELL,
Secretary.

November, 1952. (C 95)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 832, STATION SHIFT CONTROL ENGINEER, Burnley Generating Station. Salary £502/£521 (N.J.B. "C", 10).

Vacancy No. 833, ASSISTANT SHIFT CHARGE ENGINEER, Westwood Generating Station. Salary £641/£667 (N.J.B. "G", 9).

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before December 14. Quote vacancy Number. (C 51)

CROWN AGENTS FOR THE COLONIES

POWER STATION OPERATING ENGINEERS required by the Government of Nyasaland for the Electrical Services Department, for one tour of 2 to 3 years in the first instance with prospect of permanency. Commencing salary according to age and experience in scale £776 rising to £1,155 a year, including cost of living allowance. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates, aged 23 to 33, must have technical knowledge at least up to National Certificate standard, and have had shift experience in a modern steam power station operating at 400 lbs per square inch, 750°F.

Apply at once by letter, stating age, full name in block letters, and full particulars of qualifications and experience, and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London, S.W.1, quoting on letter M.29131.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 90)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF
ENGINEERING DRAUGHTSMAN (ELECTRICAL)
Area Board Headquarters, Manchester

APPLICANTS should have served a suitable apprenticeship and the possession of the Ordinary or Higher National Certificate will be an advantage. Applicants should have had experience in the layout of substations up to 33 kV and the diagrams of connections of the associated switchgear, transformers and protective systems.

Salary scale: £433 to £567 p.a., Schedule "D," Grade 6, N.J.B. conditions.

Applications to Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, by December 13, 1952.

APPOINTMENT OF SENIOR DRAUGHTSMAN
Sub-Area Engineer's Department, Oldham

Applicants should have experience in the preparation of plans and detail drawings for new buildings, the layout and construction of substations, field and site survey. Possession of an engineering qualification will be an advantage.

Salary scale: £567 to £671 p.a., Schedule "D," Grade 5, N.J.B. conditions.

Applications to Sub-Area Manager, No. 3 Sub-Area, The North Western Electricity Board, Union Street, Oldham, by December 13, 1952.

APPOINTMENT OF
FIRST ASSISTANT DISTRICT ENGINEER
4A (Preston) District

Applicants will be required to assist the District Engineer in the control, construction, operation and maintenance of the substations and distribution system in the District. Corporate membership of the Institution of Electrical Engineers or its equivalent will be an advantage.

Salary scale: £850 to £887 p.a., Grade "F.4," N.J.B. conditions.

APPOINTMENT OF
THIRD ASSISTANT DISTRICT ENGINEER
(4A (Preston) District)

Duties of the post will include assistance in operation maintenance and construction of u.g. and o.h. mains, substations and transformers, and general mains work, including standby duties. Preference given to candidates who possess the H.N.C. in electrical engineering.

Salary scale: £607 to £629 p.a., Grade "F.3," N.J.B. conditions.

Applications to Sub-Area Manager, No. 4 Sub-Area, The North Western Electricity Board, 40/41 Lune Street, Preston, by December 13, 1952.

APPOINTMENT OF
THIRD ASSISTANT DISTRICT
COMMERCIAL ENGINEER
Burnley District

Duties will include assistance in the control and supervision of industrial and domestic contract wiring, preparation of specifications and the installation, repair and maintenance of appliances on consumers' premises.

Salary scale: £607 to £629 p.a., Grade "F.3," N.J.B. conditions.

Applications to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, by December 13, 1952. (C 70)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following positions:—

TEST ENGINEER (STEAM)
Divisional Headquarters, Portsmouth S/13.359

Applicants should possess a thorough knowledge of thermo-dynamics and be experienced in the determination of efficiency and losses occurring in large turbines and condensing plant. A sound knowledge of boiler testing is also required and applicants should be well acquainted with all instruments employed in this work. Plant operating experience will be an advantage. Applicants should preferably be Corporate Members of one of the senior professional institutions.

Salary, N.J.B. "AX/CX.2," £834 to £1,025.

MAINTENANCE SUPERINTENDENT
Southampton Generating Station S/13.361

Applicants must have had considerable experience of the maintenance of all generating station plant, including boiler plant, and the overhaul of large high-pressure turbines and associated equipment, alternators, h.t. and l.t. switchgear, transformers and circulating water plant. Preference will be given to Corporate Members of one of the senior professional engineering institutions or candidates holding appropriate equivalent qualifications.

Salary, N.J.B. "F/6," £738 to £771.

SHIFT CHARGE ENGINEER
Swindon Generating Station S/13.363

Applicants should be in possession of technical qualifications leading to corporate membership of a recognised professional institution, have had previous experience in a modern generating station and preferably have had manufacturing works experience.

Salary, N.J.B. "E/7," £649 to £681.

JUNIOR ENGINEERS S/13.362

Applicants should have had a sound general education and an apprenticeship or practical training suitable to the industry. Preference will be given to graduate members of a recognised professional institution or those possessing a university degree or Higher National Certificate. The duties of those appointed will vary, but will include as a general rule the operation and control, under supervision of generating plant. Vacancies also exist for those who wish to specialise in the maintenance of instruments and other electrical and mechanical generating plant.

Salary, N.J.B., £390 to £556 depending on qualifications, experience and the position to which appointed.

Applications forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, British Electricity House, 111 High Street, Portsmouth, must be returned by December 17, 1952. (C 98)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

APPLICATIONS are invited for appointment as SENIOR ASSISTANT ENGINEER (Operation and Maintenance) in the Chief Engineer's Department.

Applicants should preferably possess a degree or equivalent technical qualification in electrical engineering and be Corporate Members of the Institution of Electrical Engineers. They should have extensive experience in the operation and maintenance of large interconnected networks at 415 V, 11 kV and 33 kV.

Salary, N.J.B. Class "AX-CX," Grade 1, £970 to £1,166.

The appointment will be superannuable. Forms of application may be obtained from the undersigned, to whom they should be returned on or before December 20, 1952.

J. MEEK,
Secretary.

November 25, 1952. (C 61)

CROWN AGENTS FOR THE COLONIES

ELECTRICAL ENGINEER required for the Central Electrification Scheme in Cyprus, for two tours each of two years with prospect of permanency. Salary according to qualifications and experience in the scale £960 rising to £1,200 a year. Cost of living allowance at present 10% of salary. Free quarters and passages. Liberal leave with full salary. Candidates must have had considerable experience in the maintenance and operation of a modern generating station; the erection and maintenance of high and low voltage overhead and underground a.c. distribution systems and substation plant; and administrative duties associated with a public electricity supply undertaking. Preference will be given to candidates who are Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London, S.W.1, quoting on letter M.2902A.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 91)

SOUTHERN ELECTRICITY BOARD

DISTRICT MANAGER

APPLICATIONS are invited for the post of District Manager, Uxbridge district of No. 1 (Southall) Sub-Area. Provisional salary, £1,325 p.a. Condition of service and ultimate salary scale will be in accordance with such terms as may be laid down from time to time by the appropriate negotiating body.

Applicants should have a sound commercial and engineering experience gained in management of electricity undertakings.

Applications on forms obtainable from The Secretary, Southern Electricity Board, Littlewick Green, Maidenhead, to be returned to him not later than December 24, 1952. (C 97)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the superannuable appointment of GENERAL ASSISTANT ENGINEER (Combustion), in the Generation (Operations) Dept. at this H.Q. Salary N.J.B. "AX/CX" 8 (£501/£675 p.a.). H.N.C. and experience in the operation and efficient control of high-pressure steam plant desirable.

Application forms, obtainable from Div. Secretary, British Electricity Authority, South Wales Division, Cardiff (Pengam Moors) Airport, Cardiff, to be returned by December 19, 1952. (C 50)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable appointment. National Joint Board salary and conditions.

ASSISTANT ENGINEER (INSTRUMENTS)
Cliff Quay Generating Station

Salary, Class "K," Grade 9, £766 to £796.

Applicants should have served an apprenticeship and have received a thorough training in the operation and maintenance of all generating station instruments (except electricity meters). A good knowledge of the engineering aspects of instrument duties is also required.

Applications, giving age and details of qualifications and experience, should be submitted to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Seuthgate, N.14, by December 13, 1952.

W. N. C. CLINCH,
Controller.
(C 69)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, A COMMERCIAL ASSISTANT in District 226 (Llanelly) in the West Central Sub-Area of the Board.

The successful applicant will be required to assist in d.c./a.c. change over and generally in all commercial duties in the district.

Salary in accordance with Class "E," Grade 7 (£629 to £645 to £660) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees to be addressed to the Secretary, to arrive by December 13, 1952.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (C 67)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

GENERAL ASSISTANT ENGINEER, Divisional Technical Engineer's Department based at Brighton. Applicants should possess H.N.C. in electrical engineering or equivalent and should preferably have a knowledge of automatic protective gear. N.J.B. conditions, salary, Class "AX," Grade 8, £501 to £639 per annum. Applications, on forms obtainable from Establishments Officer, British Electricity House, Lower Ham Road, Kingston-on-Thames, Surrey, to be received not later than December 15, 1952. (C 66)

A LARGE ORGANISATION dealing with Power Station and similar equipment requires MANAGER for Erection Department capable of organising site labour and planning large erection contracts in this country. State age, qualifications, salary expected and when at liberty.—Box No. 2237, Electrical Times. (C 58)

APPLICATIONS from electrical contracting ENGINEERS are invited who have the necessary technical qualifications to enable them to prepare electrical schemes, primarily for schools, from basic detail. They will be required to handle a project from its inception to finalisation, including full contact with clients, tendering and accounts. Successful applicants may be required to live in the Shropshire area.—Replies, stating total experience, qualifications, age and salary, and if the owner of a car, to Box No. 2225, Electrical Times. (C 41)

PERMANENT & PROGRESSIVE POSTS AVAILABLE

Important interesting work on civil and military aircraft, hydraulic accessories, air conditioning equipment, turbine units, gun control systems, also guided weapons, industrial electronic apparatus.

3	SENIOR DESIGNERS . .	Young men free of National Service (or shortly due release) particularly invited to apply. If of good education, previous experience not essential. Special facilities for junior employees for further technical study.
4	INTERMEDIATE DRAUGHTSMEN	
5	JUNIOR DRAUGHTSMEN .	
6	STRESSMEN	Candidates must hold degree. Previous experience not essential but salary adjusted for previous responsible employment in these fields.
7	MATHEMATICIAN . .	For stress calculating.
8	MATHEMATICIAN . . .	First-class honours or higher degree for work on guided weapon control systems. Knowledge of statistics and noise essential.

Apply in confidence with full details, quoting reference number of post sought, to:—

Personnel Manager,
DE HAVILLAND PROPELLERS LTD.,
Hatfield, Herts.

(C 38p)

ARMATURE WINDERS and FITTERS with repair shop experience. Top rates, 5-day week, bonus, all holidays paid, etc.—The Lewis Electric Company, Moor Works, Blackamoor Lane, Maidenhead, Berkshire. (C 32)

ASSISTANT ENGINEER/DRAUGHTSMAN required for chief electrical engineer of large commercial organisation with headquarters in London. Age limits, 23/28. Duties will include layout of electric lighting and power installations and design of lighting schemes and fittings under supervision; tests and inspection on sites throughout the U.K.; supervision of contractors; preparation of records, costs, etc. Minimum qualifications, City and Guilds or National Certificate, with practical experience of general installations, maintenance and contracting. Aptitude for drawing essential, but training will be given if necessary. Salary £400-£550 per annum, according to qualifications.—Apply to Box No. 2247, Electrical Times. (C 99)

CHIEF ACCOUNTANT, States of Guernsey Electrical Dept. Salary scale £730 to £1,005 per annum, commencing salary according to age, experience and qualifications.—For further particulars apply to the State Supervisor, State Office, Guernsey. (C 105)

CITY OF COVENTRY requires a FOREMAN ELECTRICIAN within Misc. IV-V (£420 to £540) according to qualifications and experience. Local award of 10s. per week payable in certain circumstances. Applicants to have served apprenticeship and had considerable experience in domestic and industrial installations. Preference will be given to persons with Higher National Cert. All officers are expected to be or to become members of an appropriate organisation, N.J.C. Scheme, para. 44—Application forms from City Engineer, Council House, Coventry, to be returned by December 15, 1952. (C 79)

CONSULTING ENGINEERS urgently require ELECTRICAL ENGINEERING DRAUGHTSMAN capable of preparing final drawings for lighting and power installations.—Apply in writing, stating age, experience and salary required, to E. G. Phillips, Son & Norfolk, 26 Annesley Grove, Nottingham. (C 108)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

DEVELOPMENT DESIGN DRAUGHTSMEN required for a small group engaged upon general engineering developments including special purpose automatic and semi-automatic machinery, metallurgical and chemical engineering processes and plant, combustion and electric furnaces, electrical power control and measuring equipment. Applicants must be engineers with professional or academic qualifications and workshop apprenticeship, and preferably over 28 years of age. These vacancies are only for men with high ability and several years' experience of original design, and capable of supporting a programme of rapid capital expansion and long-term development. Candidates should be able to produce recent references and sample designs if necessary.—Apply: Personnel Manager, Garringtons, Ltd., Bromsgrove. (C 72)

DRAUGHTSMAN, Electrical, required. Diagrams, general layouts, also cable runs, similar to power station work.—State age, salary required, according to experience, to Box No. 2243, Electrical Times. (C 83)

DRAUGHTSMEN required for transformer drawing office. Previous experience of power distribution, radio or welding transformers is desirable. Progressive positions are offered to men with initiative in expanding department of large modern works on Merseyside. Housing assistance available for selected applicants.—Reply, giving details of age, experience and present occupation, to Box No. 2227, Electrical Times (quoting Ref. AFA). (C 42)

DRAUGHTSMEN required with experience of light electro-mechanical devices for interesting new development and production drawing office work on domestic appliances and television receivers. Good opportunities for men with imagination and initiative in expanding department of large modern works in N.W. England. Housing assistance available for selected applicants.—Reply quoting Ref. AJEE to Box No. 2233 Electrical Times, giving details of age, experience and present occupation. (C 45)

ELECTRICAL ASSISTANTS of British nationality and British parentage, required to design schemes and to prepare drawings for internal services in buildings, and low tension underground and overhead line systems. Victoria location. Salary £350 to £700 according to experience.—Box No. 2245, Electrical Times. (C 88)

ELECTRICAL DRAUGHTSMAN required by firm of Consulting Engineers for work on lighting and power layout drawings. Age 20-25.—Write, stating qualifications, experience and salary required, to J. Roger Preston and Partners, Dilke House, Malet Street, W.C.1. (C 77)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ELECTRICAL DRAUGHTSMEN required for power distribution layouts and lighting installations for industrial plants. London office, 5-day week, pension scheme. —Write, full particulars, age, qualifications, experience and salary required, to Box 6371, c/o Charles Barker and Sons, Ltd., 31 Budge Row, London E.C.4. (C 56)

ELECTRICAL ENGINEER required for gold mine in Tanganyika. Must be experienced and thoroughly conversant with the installation and maintenance of heavy industrial electrical plant, h.t. and l.t. transmission, fault location, etc., generating plant and associated protective equipment; must be able to control and train unskilled native labour. Minimum qualifications, Higher National Certificate. Salary £80 per month, 30 months' contract, satisfactory man may be re-engaged on pensionable basis after first contract, free house and light, passages out and home with generous leave provisions. Good climate.—Write, giving full particulars and copies of testimonials, to Box "F.Z.," c/o J. W. Vickers & Co., Ltd., 7/8 Great Winchester Street, London E.C.2. (C 74)

ELECTRICAL ENGINEER required as general technical assistant in overhead line insulator department. Duties will be connected primarily with technical aspects of design and manufacture. The post is superannuable and offers opportunities for promotion. Degree in electrical engineering is an essential qualification and a recognised apprenticeship with a large industrial manufacturer desirable. Age 25/30. Salary according to age, experience and qualifications.—Replies to be addressed to Chief Personnel Officer, Pilkington Brothers Limited, St. Helens, Lancashire. (C 75)

ENGINEERING MANAGEMENT. Owing to continued expansion, an internationally known engineering company has vacancies of particular interest to ambitious men aged 25 to 30 years, wishing to train for positions of responsibility in production and management. Initial salaries will be up to £1,000 per annum. Ideal applicants will:—

1. Have an engineering or science degree.
2. Be members of a recognized engineering institution.
3. Have had practical engineering training or experience.

Applications from those meeting any two of these requirements will be considered. Please write, giving age and full details of education and experience, to Box No. 2241, Electrical Times. (C 76)

ESTIMATOR required for indoor Sales Staff by Crompton Parkinson Ltd., Chelmsford. Must have had experiences in dealing with enquiries relating to d.c. and a.c. motors, generators and control gear.—Apply to Personnel Officer. (C 57)

EXPERIENCED and qualified TECHNICAL ASSISTANT (Electrical, Heating and Ventilating) required by Harlow Development Corporation. Salary, £625 by £25 to £725 per annum. Superannuation. Housing.—Detailed applications, with names of two referees, to General Manager, Terlings, Gilston, Harlow, Essex, by December 31, 1952. (C 62)

GENERAL ASSISTANT ENGINEER (Protection) required for the North Wales Region of Technical Department, British Electricity Authority, Merseyside and North Wales Division. Salary £501 to £539 N.J.B. Class "AX" Grade 8. Superannuable and subject to medical examination.

Applicants should have passed the Higher National Certificate in Electrical Engineering and have practical experience in the testing of E.H.V. switchgear installations, site-testing of relay and control circuits or relay testing and adjustment in manufacturer's works.

Application forms may be obtained from Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date, December 20, 1952. (C 94)

THE GENERAL ELECTRIC COMPANY LIMITED
WITTON, BIRMINGHAM

requires Winders for turbo-alternators and large a.c. and d.c. machines. High level earnings and good shop conditions; pension scheme. Housing assistance will be given in approved cases. Apply by letter, giving full details of experience, to:—

The Labour Manager,
THE GENERAL ELECTRIC COMPANY LIMITED
Electric Avenue, Witton, Birmingham 6 (C 31p)

HIGH FREQUENCY SENIOR ELECTRICAL ENGINEER required for maintenance and operation of large high frequency unit. Top position, high salary and opportunity for experienced go-ahead man.—Write full details in confidence to Director, Microcell Ltd., 56 Kingsway, London W.C.2. (C 87)

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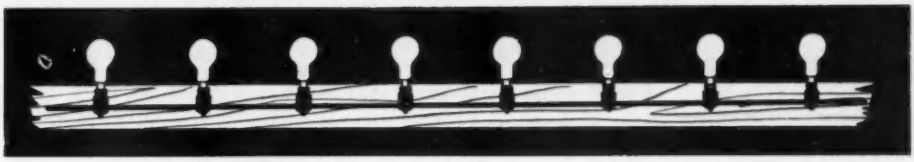

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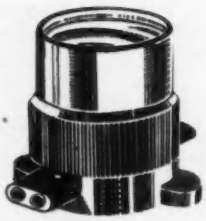

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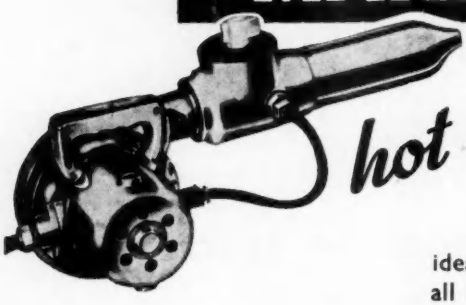

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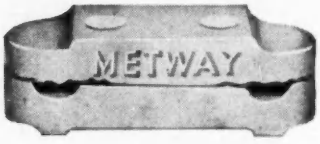

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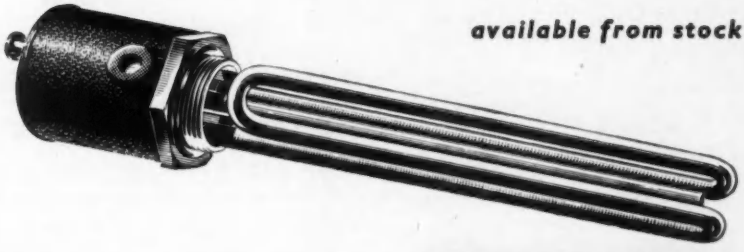

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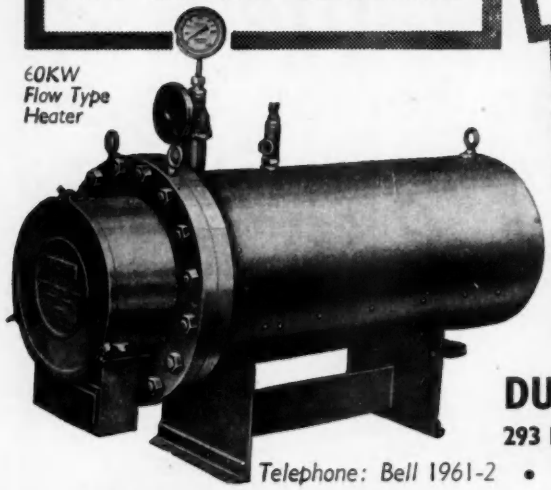

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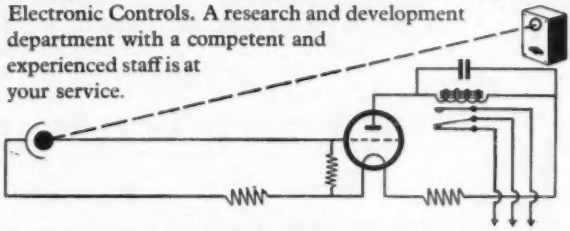

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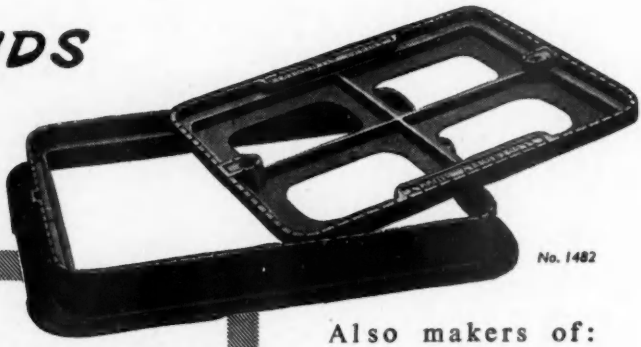

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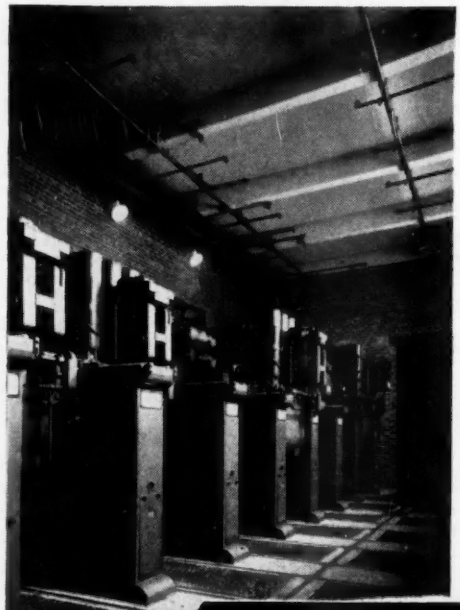

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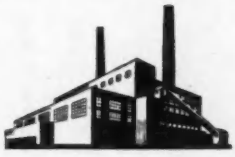

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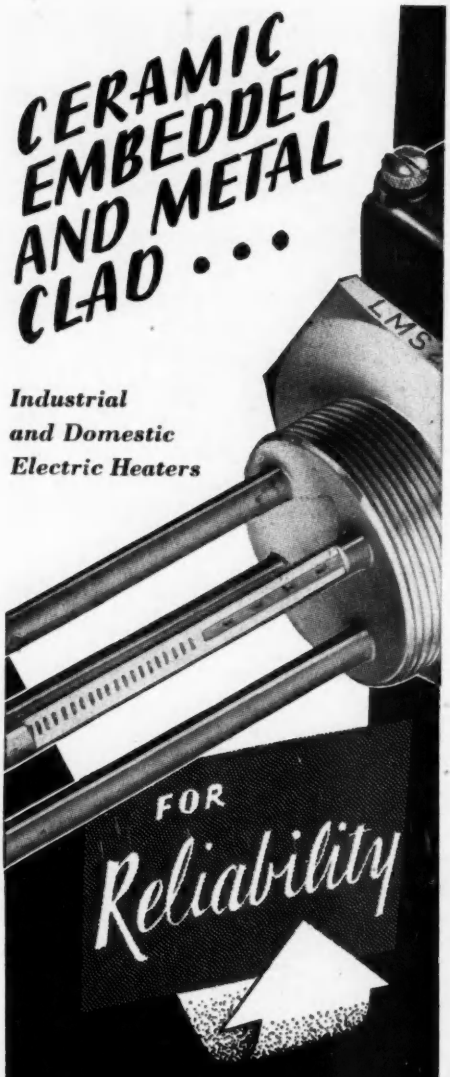

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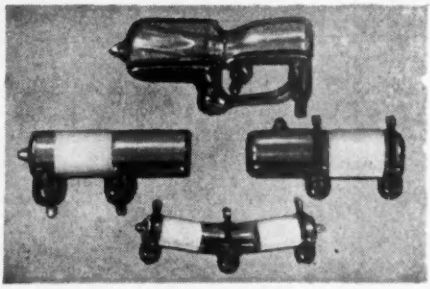

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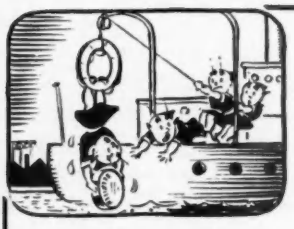

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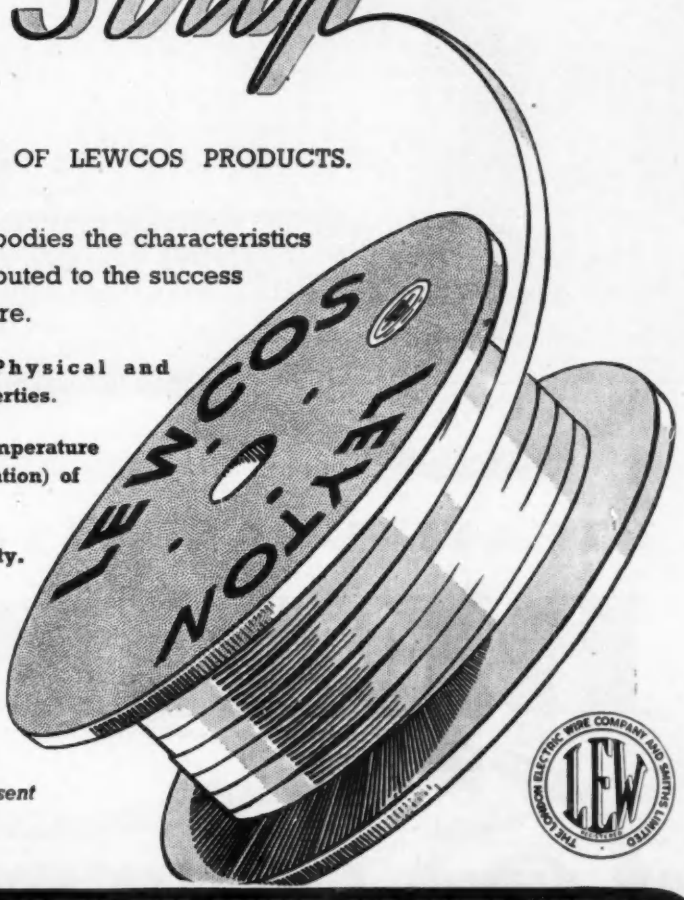

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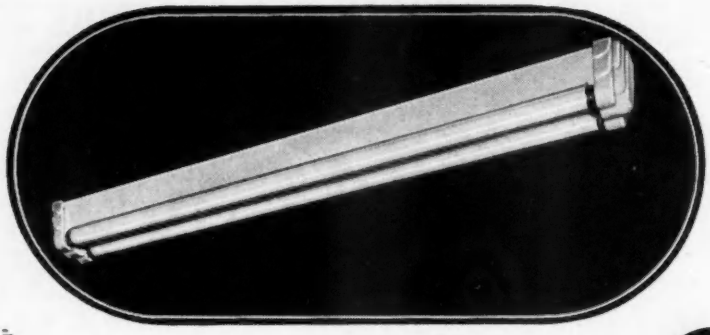

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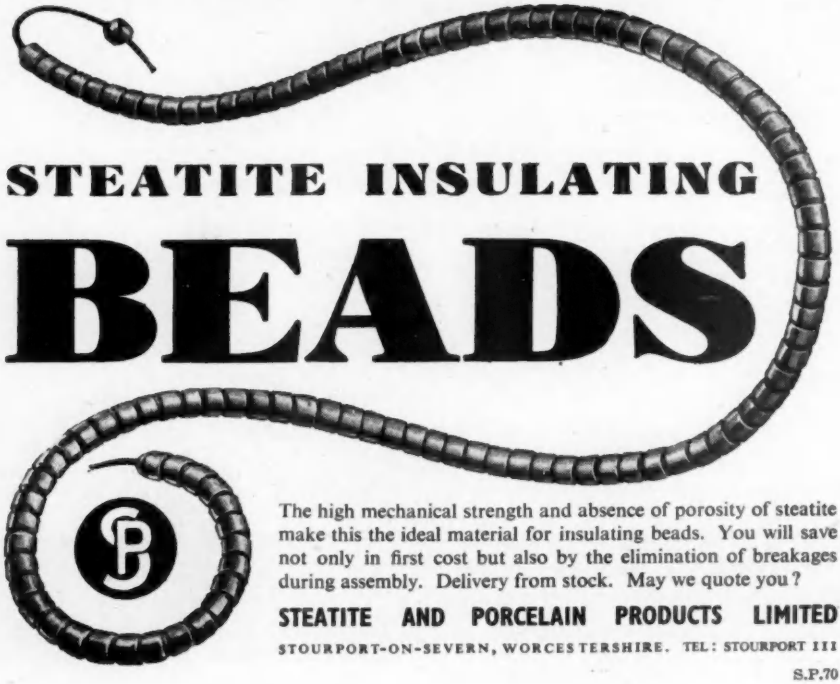

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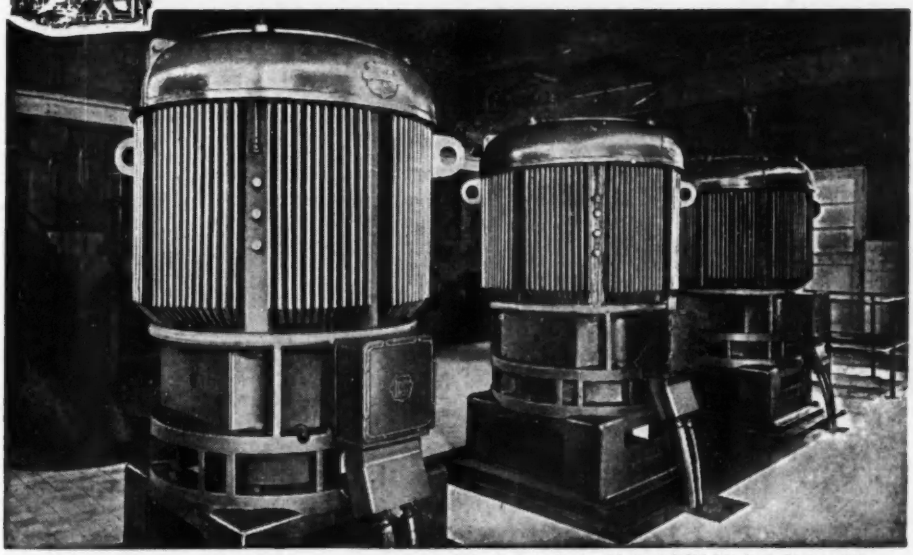

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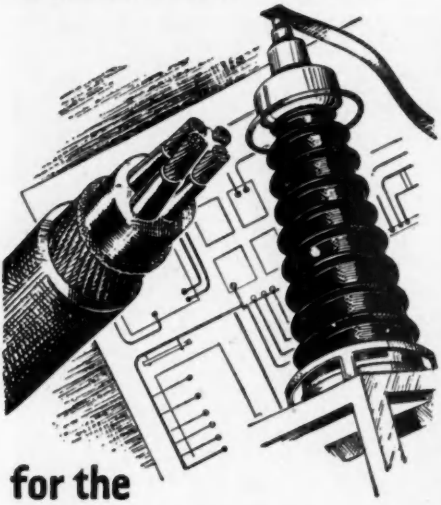

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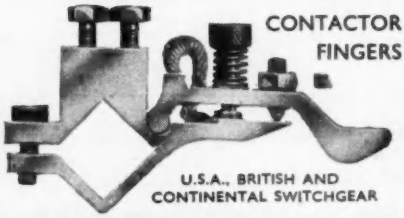

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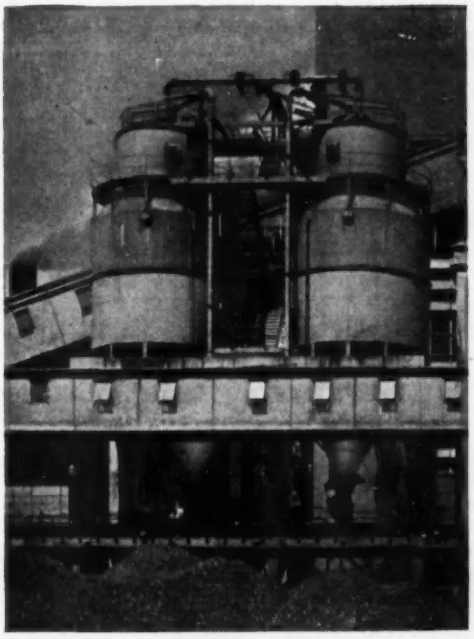

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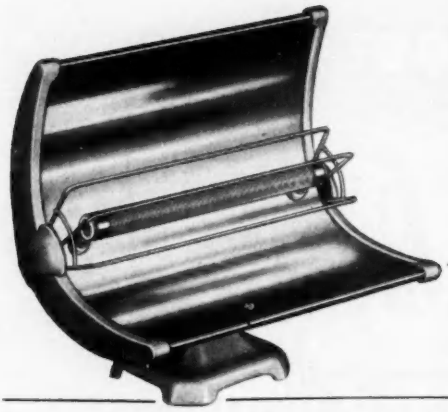

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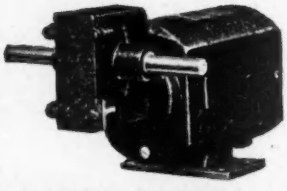

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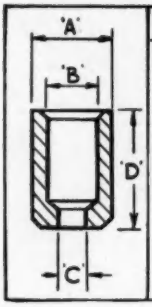

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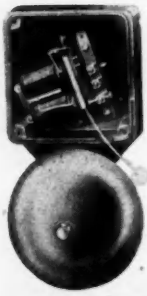

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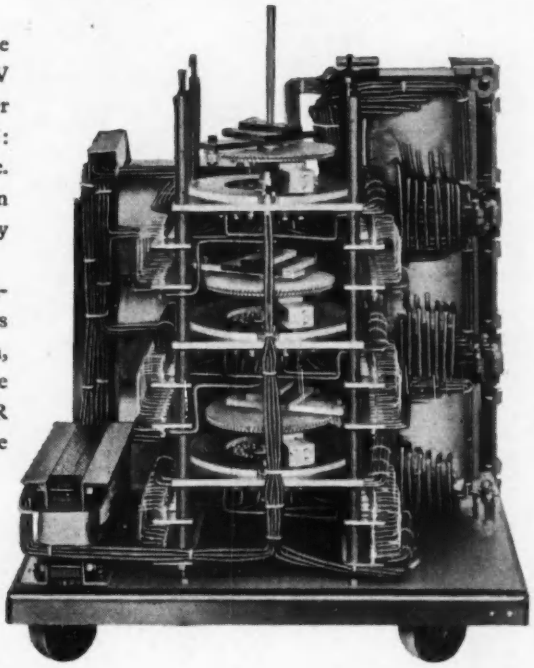

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FOSTER TRANSFORMERS LIMITED

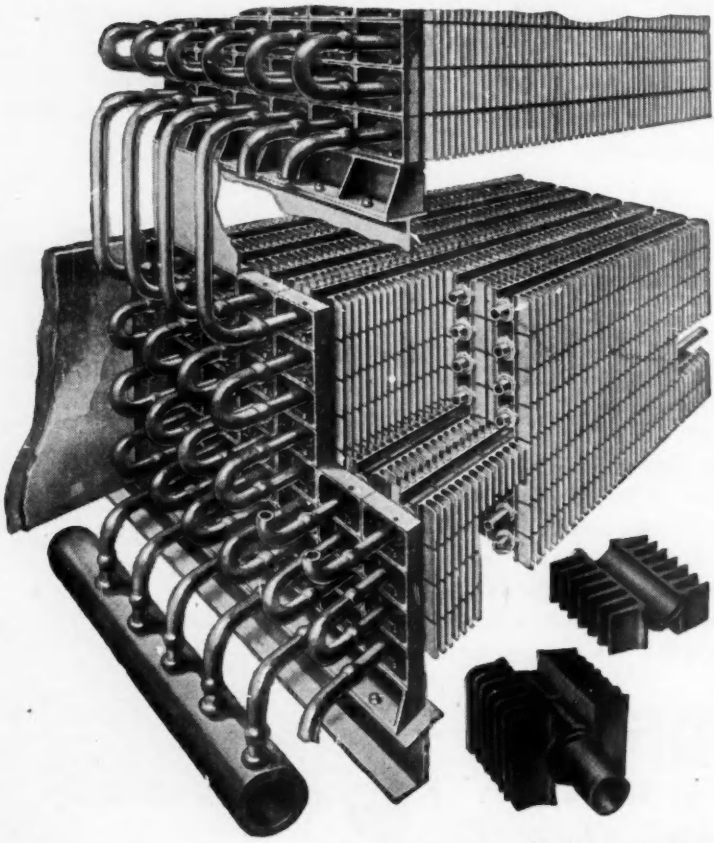
SOUTH WIMBLEDON · LONDON · S.W.19 · TELEPHONE: LIBERTY 2211

A 'Lancashire Dynamo' Company

F/8b

SENIOR ECONOMISER

WELDED TYPE, FOR CENTRAL POWER STATIONS



Showing construction of Tube Elements

For all operating pressures up to the highest

SENIOR ECONOMISERS LTD., 11 SOUTHAMPTON ROW, LONDON W.C.1

Telephone: HOLborn 7543-4 and 1158

Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts, and published at Sardinia House, Sardinia Street, London W.C.2. December 4, 1952

Aeroflex
HOPE'S PATENTS

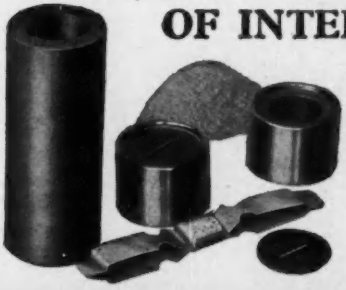
CERAM TYPE CSK

CARTRIDGE FUSE LINKS

60 amp. size with 45, 30 & 15 amp. underwirings

With dimensions according with BS.1361, breaking capacity according with BS.88 category 440 AC4, fusing factor to Class P, complete freedom from ageing and the retention of all Aeroflex established characteristics, including rewireability, the Ceram Fuse provides the complete answer to all needs for protection in consumers' circuits.

THE ECONOMY OF INTERCHANGEABILITY



Aeroflex Ceram Fuse Links are interchangeable with other leading makes.

PARMITER HOPE & SUGDEN LIMITED
FLUVENT Electrical Works, Longsight, MANCHESTER 12
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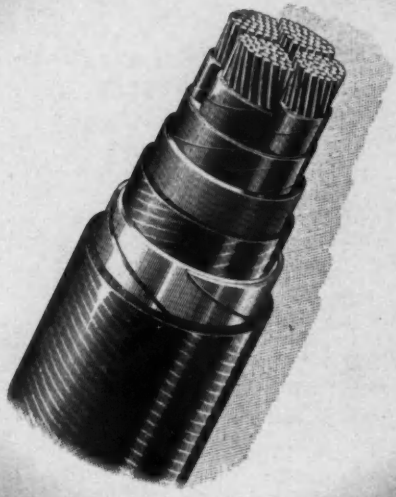
dm PH 55



Many cables are made to specification but it is by their attention to unspecified *details that Aberdare's reputation has been built.*

Aberdare Cables

Paper insulated cables up to 33kV, to BSS or special requirements.

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